NEW ZEALAND JOURNAL OF Agriculture

JUNE - 1956

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This Month's Cover

Young pigs interest people of all ages, but particularly children, as this month's cover clearly shows. Giving a boy a few pigs of his own to manage is probably one of the surest ways of gaining his continued interest in the dairy farm. Later, complete control of the pig section of the farm can provide a son with sufficient interest and inducement to remain on a property which otherwise might not seem to offer sufficient scope for his initiative. If given the chance, such a youth will probably build up the pig section to give valuable diversification in production. This month's cover has been reproduced from a colour photograph by National Publicity Studios.

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The History of Subterranean Clover in New Zealand

DURING the last 40 years or so there have been many advances in grassland farming practices. Of these the increase in the use of subterranean clover must rank very highly in importance in comparison with other advances such as topdressing, certification of seed, improved methods of pasture establishment, and the use of trace elements. This article by S. H. Saxby, Agrostologist, Department of Agriculture, Wellington, outlines the history of subterranean clover in New Zealand and discusses its rise to the important position which it now holds in present-day pastoral farming.

SUBTERRANEAN clover was first recorded in New Zealand as a rare plant occurring in waste places in the Auckland district.(1) How it got to the Auckland district is not known, but it is recorded that before 1906 samples of subterranean clover seed had been collected and distributed by Mr. A. W. Howard of South Australia to "all parts of Australia, New Zealand, and South Africa".(2)

For many years subterranean clover was regarded in New Zealand as a plant of little importance and in many cases as a weed. Some years after it was first recorded it had become fairly common and was known in the Auckland district as "Mangere clover". On the whole it was regarded as a worthless annual in dairying pastures which dried out in summer, but, as is the case with many other plants, it was accepted to a small extent as being of some value because it grew in positions where nothing better would grow.

Experimental Sowings

As far as is known the first experimental sowings of subterranean clover were made in 1911 at Kumeu, north of Auckland, when it was one of a number of pasture plants which were being tested in the search for plants suitable for pastures on gumland. In the following year it was reported as "Very hardy. Grows and spreads very quickly".(3)

In 1912 it was one of a number of species which were being tested for the grassing of pumice country at Reporoa, where in 1913 it was reported as being very promising.(4) It was also reported (5) that "underground clover" (presumably subterranean clover) was one of the plants which were giving the best results in trials in the Mackenzie Country in 1913.

It is not known when subterranean clover was first sown by farmers, but a sowing which took place about or before 1915 in a paddock on the shingly plains of the Wairarapa was most probably one of the earliest.(6) In 1935, 20 years later, subterranean clover from this sowing had spread all over the farm and was proving to be very valuable.

By 1918 subterranean clover was apparently being sown by some farmers, because it was then referred to as one of several species that were "occasionally sown".(7) Its increase in use is indicated by the fact that in 1921 it was common at Mangere and parts of the Bombay and Pukekohe area and was also well established on the volcanic soils near Whangarei. It had been surface sown in one paddock of the Ruakura Farm of Instruction in the early days of the farm, and in 1921 this paddock was a dominant paspalum-subterranean clover pasture.

The fact that subterranean clover was then regarded as being of only minor importance is indicated in a comment made in 1922 to the effect that it is "a small, prostrate annual clover . . . useful for filling up the bottom of pastures, particularly on dry land where the sole is naturally thin." (8) The fact that it was regarded as small suggests that it was not topdressed at that time.

By 1923 the use of subterranean clover was being cautiously advocated, as is shown in the following comment. (9) "A little could be with advantage

HEADING PHOTOGRAPH: The Mangere district in Auckland Province. Subterranean clover was first recorded in New Zealand as a rare plant in this district and was known for many years as Mangere clover.

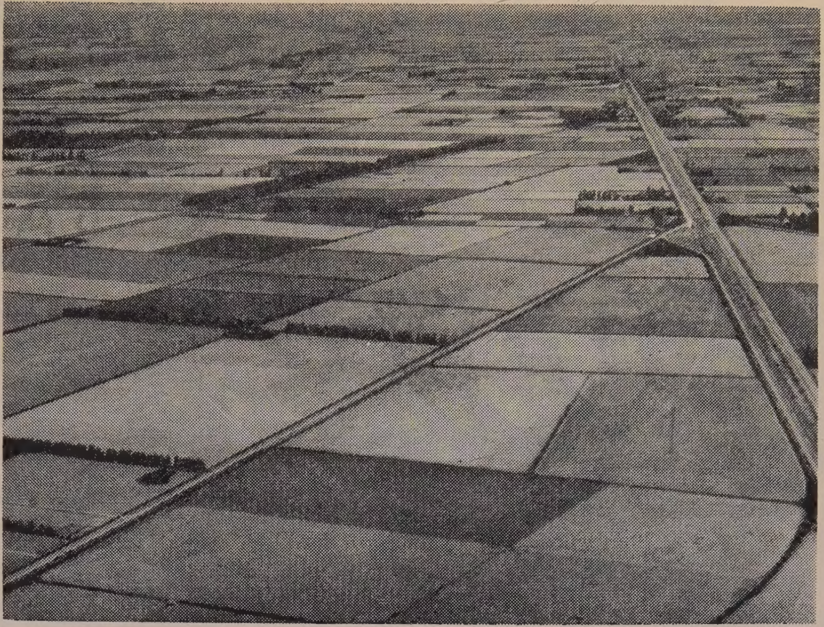
sown on bare land in permanent pastures." Even so, it was still regarded mainly as one of a number of volunteer plants which were often of value on thin, dry pastures because they produced "a certain amount of palatable food". That it had spread is shown by the comment "in some places in the Auckland Province it is said to take possession of pastures". At the same time its use in seeds mixtures for a wide variety of conditions was recommended.(10)

That subterranean clover was being used in the early 1920s by at least some farmers is indicated by a report which stated that all of New Zealand's requirements of subterranean clover seed were at that time (1924) imported from Britain and Australia.(11) The amount imported was not stated. It was regarded then as being one of the more uncommon seeds.(12)

The first records of the use of subterranean clover on hill country are contained in an article published in 1924 (13) which discusses the sowing of a number of large plots on secondary growth burns in the hill country of Taranaki with seeds mixtures in which subterranean clover was included. Some months after sowing it was reported that "subterranean clover is of outstanding promise", even though it was sown at low rates ranging from 2oz. to 1lb. per acre.

Though it was recorded by the Seed-testing Station in 1924 as being one of the less common seeds, its use must have been increasing, because an article(14) published in 1925 dealing with the value of subterranean clover in paspalum pastures stated that the value of subterranean clover in the Auckland Province was well recognised. Though there had been many failures in the past, it was pointed out that this clover required high fertility and that for it to be of any real value topdressing with phosphatic fertiliser was essential. This is the first reference found to this now well-recognised and important fact. The sowing of from 2oz. to 1lb. per acre as a surface sowing and from 1lb. to 2lb. per acre on ploughed land was recommended.

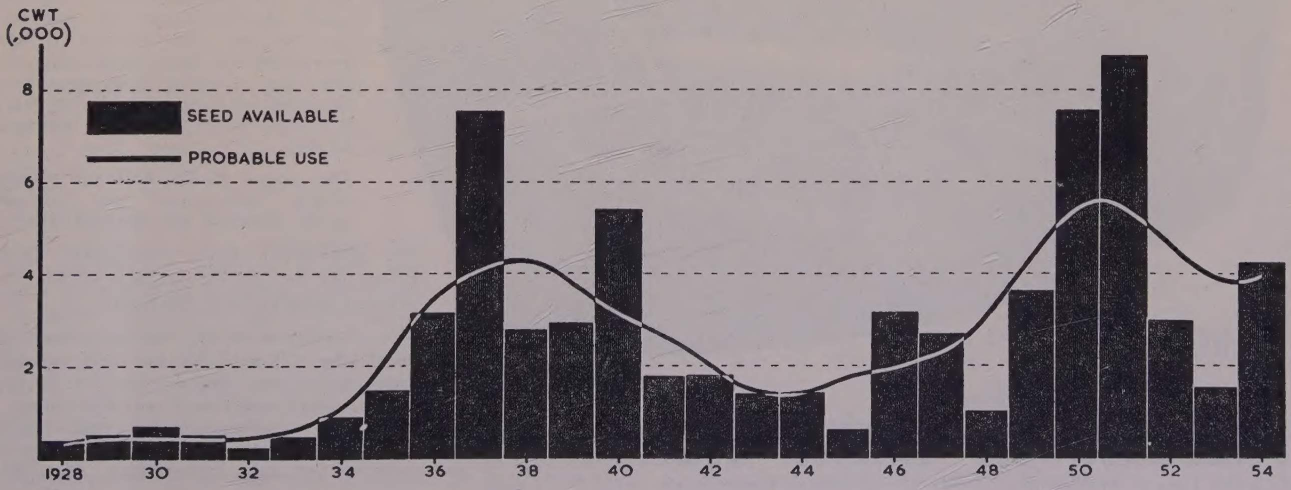
About this time the use of subterranean clover must have become fairly widespread, probably owing to farmers sowing small areas of it in many parts of the country. In 1926 it was stated that it "has spread to most or all districts where ploughing is practised". (15) Nevertheless it had not yet come into its own as a useful pasture plant, as is shown by the comment "If there are no better grasses or clovers growing on the land then subterranean clover is a useful volunteer". It was recorded as "a valuable ingredient in paspalum pastures", but it was stated that "in better pastures the aggressive nature of this clover causes it to be almost always regarded as a weed".



[*V. C. Browne*

By the late 1930s the improvement of much of the dry shingly land of the Canterbury Plains had been carried out with the sowing of subterranean clover.

The black columns show the amount of subterranean clover seed imported into New Zealand from 1928 to 1954. The line shows what was the probable usage of subterranean clover in the period.



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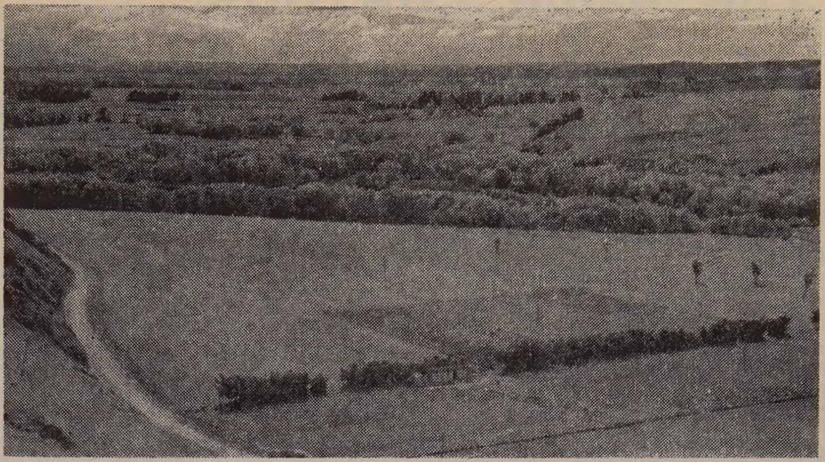

[*National Publicity*

On the dry plains and rolling country of Hawke's Bay subterranean clover was being used in considerable amounts in the middle 1930s. Its use there enabled dry-sheep country of low carrying capacity to be converted into fattening country carrying up to 4 ewes to the acre.

Though subterranean clover had been used as early as 1913 in experimental sowings in Canterbury, it was not until 1925 that it was first recorded there(16) as a naturalised plant. It was possibly fairly common in Canterbury at about that time, because it was stated(17) that it was beginning to appear, but that it had the weakness of providing no feed during the hot, dry summer months.

In spite of the good start which subterranean clover had made on the secondary growth sowings in Taranaki already referred to, its early promise was not fulfilled(18) and the sowing of it by farmers was not recommended except on a trial basis at not more than ¼lb. per acre.

The purposeful introduction of subterranean clover on the light land of Hawke's Bay probably began about 1928. For example, it is reported(6) that in 1928 one farmer sowed 35 acres on the Ruatahuna Plain with subterranean clover at the rate of 10lb. per acre. It is possible that this heavy and successful seeding resulted in such a good pasture that interest in this clover in the district was greatly stimulated.

When subterranean clover was introduced into the Marlborough district is not certain, but the clover seed was being harvested in that area in 1927 and had been for several years before. (19)

Interest was being aroused in Canterbury in the late 1920s. About 1929 the Canterbury Seed Company began sowing 1000 acres in subterranean clover which was later reported(20) to have been very successful. These pastures were sown in early autumn with a mixture of 10lb. to 12lb. per acre of cocksfoot and 2½lb. to 3lb. per acre of subterranean clover. Autumn applications of superphosphate at 1cwt. per acre annually were found to be very beneficial.

Up to the early 1930s, however, subterranean clover was being used over a wide area, but only by a comparatively small number of those enterprising farmers who are always prepared and anxious to try something new, particularly on poor land. The experience of these farmers soon convinced others, and by 1933 the value of the clover was reported to be well recognised, particularly in Central Hawke's Bay.(21)

Investigation of Strains

About this time investigations into the strains of various grasses and clovers had been initiated at the Plant Research Station in Palmerston North. A collection of strains of subterranean clover was under critical study there in 1933 and it was stated that(22) "Our tests confirm the Australian reports that important differences occur in this species". The strains of subterranean clover were discussed in detail in a paper presented to the 5th annual conference of the New Zealand Grassland Association in 1936. This paper, which was first published in "The New Zealand Journal of Agriculture"(23), is the only detailed statement that has been published on this subject in New Zealand.

The satisfactory progress in the use of subterranean clover had been such that it was possible to state in 1935 that (24) "One of the outstanding developments of the present time is what may be termed the peaceful penetration of the cult for growing subterranean clover". About this time a large number of trials with subterranean clover were laid down by the Department of Agriculture partly to ascertain the place of the clover in various parts of the country, partly to ascertain the best methods of establishment and management, and partly to try out in the field the various strains which had been under trial at the Plant Research Station.

Recognition of Value

At the 1936 conference of the New Zealand Grassland Association a symposium(25) on subterranean clover created much interest and revealed that the use of subterranean clover in the North Island was spreading very rapidly and that farmers were enthusiastic about it, particularly in those parts of the Manawatu, Wairarapa, and Hawke's Bay where the land was too dry to grow white clover. For example, it was stated that in 1936 12 tons of subterranean clover seed were sown in the Manawatu, though only a few pounds had been sown there 5 years before. In Hawke's Bay 30 tons were used. By this time it was recognised that a most important feature of subterranean clover was that it enabled phosphate to give a handsome return when used in low-rainfall areas. It was also realised that its failure in the past, particularly on hill country, had been due to a lack of appreciation of its need for phosphate.

In Canterbury the value of subterranean clover had also been recognised and large quantities had been sown there in the autumns of 1935 and 1936. In 1937 Canterbury Agricultural College began the development of its light-land farm at Ashley Dene mainly through the use of subterranean clover. (26) The success achieved there doubtless played an important part in the spread in the use of subterranean clover on the light lands of Canterbury.

By 1938 subterranean clover was being used extensively, particularly on the plains and easy country of the southern part of the North Island and in the northern part of the South Island. It was stated in 1938 that "One of the latest outstanding vogues in farming has been that of subterranean clover. . . ."(27)

In Otago the use of subterranean clover was confined to a few areas in the inland districts and to the drier coastal and river valley areas from Palmerston northward. In the higher-rainfall areas it was not required, because white clover with the aid of lime and phosphate was able to thrive. It must, however, have been tried out by some farmers on this country, because one stand at least 10 years old was seen in 1937 near Milton, a district in which it will grow but where its value is limited because white clover will thrive there.

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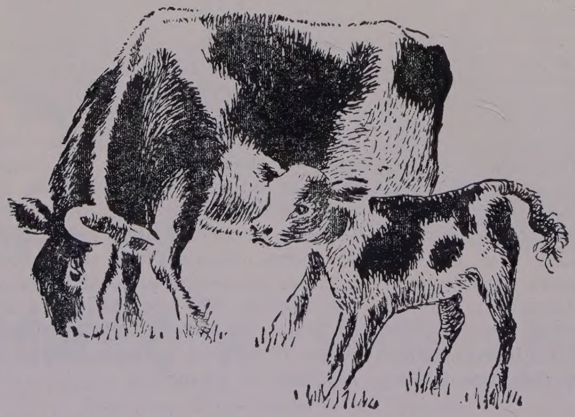

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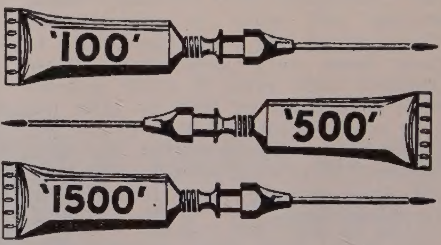
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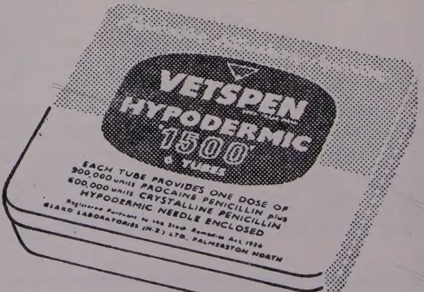
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Subterranean clover has been of great value in improving much of the sand country of the west coast of the Wellington Province.

Records of the importation of subterranean clover seed detailed in the graph on page 519 show that the amount imported increased rapidly from 1934 to 1940 but declined from then on during the war and in 1945 reached a low level equivalent to that of the late 1920s. Since the war, after a rather slow start, importations of subterranean clover seed reached a record peak in 1951, after which importations eased off appreciably.

Slowness of Acceptance

This summary of the introduction and spread of subterranean clover in New Zealand's grassland is of interest because it shows how slow the acceptance of a new species of plant can be. There is little evidence to suggest that farmers were reluctant to try it. In fact, the evidence is that many were very keen to try it, but that for various reasons the majority were unsuccessful either in establishing or maintaining it. It is the "various reasons" which are of considerable interest.

For a long time subterranean clover was regarded as an annual clover which grew well only under conditions of high fertility and high rainfall and was of little use because it left the pastures open and suitable for weed invasion in autumn. It was also recognised that it would grow as a component of a low-producing sward on poor, dry country and that though under these conditions it was of comparatively little value, it was better than nothing. The first experimental work carried out with it was on a poor gumland soil.

From about 1910 to 1920 it was regarded by most people as little better than a weed whether under high- or low-fertility conditions. Because it was so regarded, it had a bad name which stayed with it for many years, particularly in parts of the Auckland district, where it was important as a weed in dry pastures and annual crops.

After its successful use in Australia its value was recognised by some people in New Zealand in the early and mid 1920s, but as a winter- and spring-producing annual associated with a summer-producing grass such as paspalum. It was considered that high-fertility conditions and at least fairly high-rainfall conditions were necessary for it to thrive, and its response to topdressing on poor land was barely appreciated. Its use was therefore confined mainly to fertile and moist soils.

Though at that time a considerable area of grassland was being topdressed, this was confined mainly to the high-producing dairy pastures on good land where white clover would thrive. During the late 1920s the area of grassland topdressed each year grew rapidly and records of seed importations provide evidence to show that subterranean clover was being used to an increasing, but not very great, extent. Trials with subterranean clover on hill country secondary-growth burns were very promising at first, but this early promise of success was not fulfilled. This was almost certainly due to the fact that the clover grew well in the ash for the first year or so, but gradually died out because of the lack of topdressing with phosphatic fertilisers. Widespread failures to establish subterranean clover at this time in many districts were doubtless due to the same cause. These failures, together with the marked reduction in the amount of topdressing carried out during the depression years, resulted in a falling off in the amount of subterranean clover seed used. As prices for farm produce improved toward the end of the depression so did the amount of fertiliser used on pastures also increase. Experience gained before and during the depression had shown quite clearly that subterranean clover was of little value unless it was topdressed.

The year 1934 marks the beginning of a period of very rapid expansion in the use of subterranean clover. Much of the knowledge of how to establish it and maintain it had been gained before the depression and all that was lacking was the finance to buy the fertiliser. Some courage must have been required for farmers to apply fertiliser to light, stony land that in most cases was carrying half a breeding ewe or less per acre and which had not been worth topdressing before.

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The aerial application of subterranean clover, white clover, and phosphatic fertilisers is being used as the basis for the improvement of much of the hill country in the North Island.

That their courage was justified was amply shown in the tremendous improvement made on much of the light, stony plains land of Hawke's Bay, Wairarapa, and Canterbury, where subterranean clover together with phosphate not only often eliminated the need for cropping but also enabled farmers to fatten lambs where this was rarely possible before and to treble their carrying capacity of ewes.

At this time subterranean clover was being sown to a limited extent on hill country, but because of the difficulty of applying fertiliser by hand only a comparatively small area was improved in this manner. Its use was, however, spreading rapidly on suitable country on which wheeled machinery could be driven. In Hawke's Bay, for example, large areas of easy rolling hill country were being converted from cloverless danthonia pastures to subterranean clover-perennial ryegrass pastures.

The value and place of subterranean clover were well established in 1939. Once again after the outbreak of war fertiliser became short, not because of lack of finance, but because of lack of shipping and later the loss of the sources of much of the rock phosphate. Importations of subterranean clover seed dropped to a low level and stayed there until the end of the war. As rationing of fertilisers eased off and the shipping position improved more subterranean clover seed was imported, but it was not until 1949 that large quantities began to be imported again. The increase in the availability of both fertiliser and subterranean clover seed coincided with high prices for farm products and the replacement of hand topdressing of hill country with mechanical means; first the blower topdresser and later the aeroplane, which began commercial aerial topdressing operations in 1949. This marked the beginning of a period of widespread surface sowing of hill country grassland, a practice which is still expanding.

Management of Subterranean Clover

Part of the failure of subterranean clover when it was first being tested was due to the light rates of seeding adopted. Many sowings were made at ½lb. per acre and less. This, combined with an absence of phosphate, must have resulted in many failures, not only with the initial strike, but also with survival. The present practice of sowing 2lb. to 3lb. or even up to 6lb. per acre together with 2cwt. to 3cwt. of superphosphate gives the clovers a much better chance to establish, thrive, and reseed.

One of the most important points in establishing subterranean clover is to sow and manage it in such a way that it is able to reseed freely and re-establish, particularly for the first year or two. Two difficulties arise in the achievement of this. Though it has been found that autumn sowings are ultimately the most successful, many young stands of subterranean clover have been lost or almost lost because of a dry spell after germination and the subsequent death of many of the seedlings. In the colder districts this difficulty is accentuated by the fact that many of the remaining seedlings are damaged or killed by early frosts. The result is that the establishment of the stand may ultimately be dependent on those hard seeds which may germinate in spring. Many young stands have been destroyed by such a sequence of conditions.

Subterranean clover is a prolific seeder, and once a stand is well established the amount of seed set per acre

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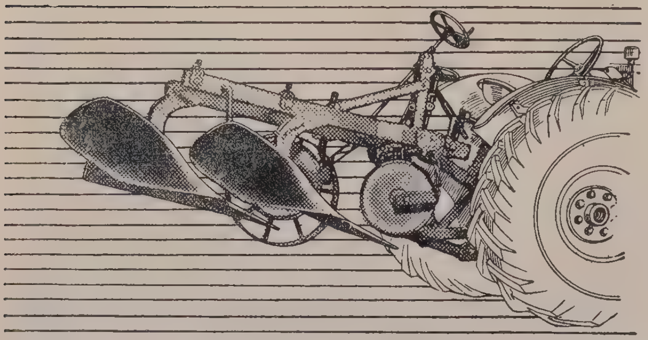

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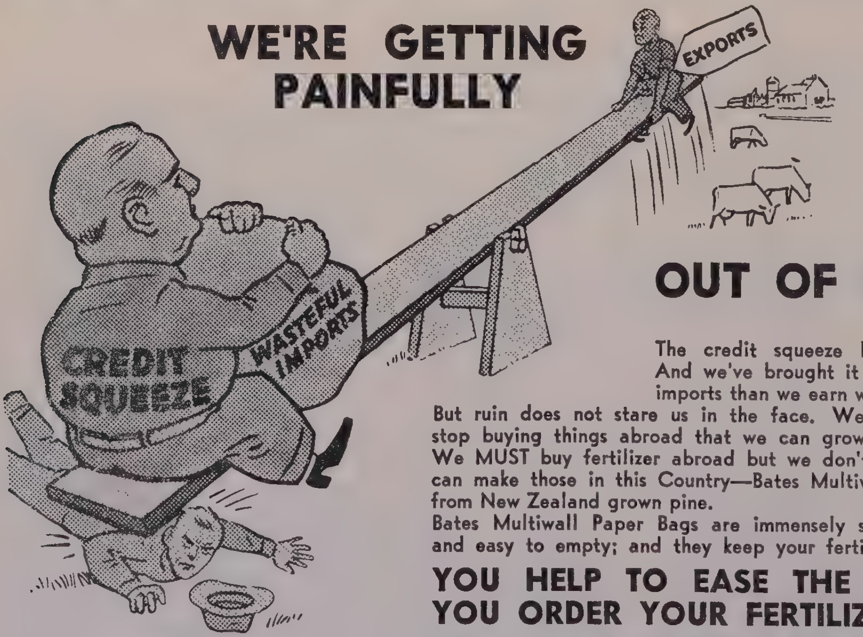

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is very large. This is instanced by the fact that yields of over 1000lb. of seed per acre have been harvested. On one established stand it was ascertained that the seedlings which germinated after the first autumn rains represented a seeding of over 190lb. per acre.

Such large amounts of seed ensure the survival of the stand even though many seedlings may be killed by dry conditions and more by the action of frost, but until there is ample seed buried in the ground the survival of a stand of subterranean clover is in the balance. For this reason every endeavour must be made to encourage seeding in the first 2 years. Once it is well established subterranean clover will seed sufficiently under hard grazing to ensure its survival.

Successful Strains

Of the many strains of subterranean clover which have been tried out only two have been found to be of value under New Zealand conditions. These are the mid-season strain typified by the Mt. Barker variety and the late-flowering strain typified by the Tallarook variety. The Mt. Barker variety is the more widely used, largely because the seed supplies of it are more readily available. It is also the better winter growing variety of the two. The Tallarook variety is somewhat later in producing both leaf and flower, but it has the advantage of being a prolific seed producer and of being more resistant to leaf rust. It also tends to form a denser sward than does the Mt. Barker. In most parts of New Zealand, particularly where seed production is not envisaged, it has been found that the sowing of a mixture of equal quantities of the two strains gives satisfactory results in that a good cover with a reasonably long period of production is secured.

Conclusion

The introduction of subterranean clover into New Zealand can be divided into four somewhat arbitrary periods.

1. **From 1906 to 1925:** Subterranean clover was regarded mainly as a weed. On good country it grew quite well, but not as well as white clover, and it had the disadvantage of ceasing production during summer. It was, however, used to some extent as a winter and spring producer in association with paspalum. On light land it was regarded as being of no particular value. Low rates of seeding were adopted.
2. **From 1925 to 1934:** Subterranean clover was tried out extensively, but was not sown on a large scale. During this period its response to phosphate was being slowly appreciated. Seeding rates were increased and management practices were worked out. Its widespread use on light land was restricted in the early stages of this period because of lack of knowledge and at the end of the period because of lack of finance during the depression.

Where conditions are not too dry subterranean clover and white clover combine to form the basis of high-producing grass-clover pastures.

3. **From 1934 to 1947:** After the depression subterranean clover was used extensively and the management practices previously worked out were applied with success. The use of subterranean clover made rapid progress on the plains and easy country, but comparatively little progress on the unploughable hill country. Its reduced use during the war was due mainly to lack of fertiliser and to some extent to lack of seed.
4. **From 1947 to the present:** During this period its sowing on easy country has continued and in addition there has been a very rapid increase in its use on hill country because of the satisfactory prices for primary produce and the advent of the blower and aerial seeding and topdressing.

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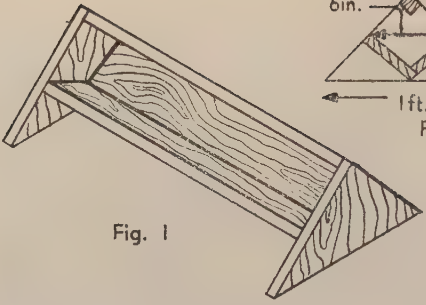


Fig. 1

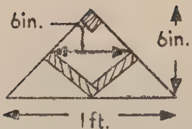


Fig. 2

Troughs

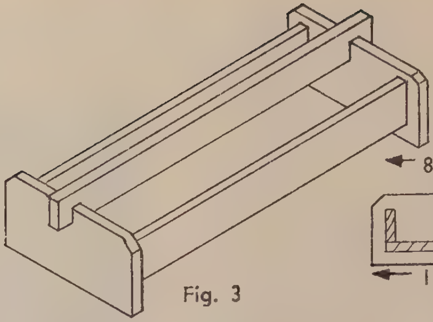


Fig. 3

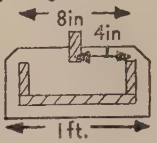


Fig. 4

Equipment for Backyard Poultry Keepers

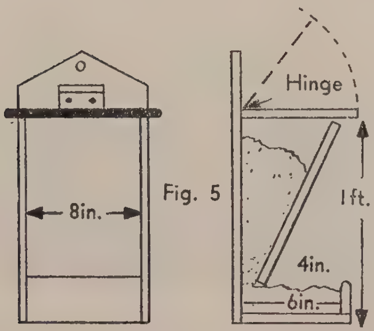

8in.
Hinge
1ft.
4in.
6in.

Fig. 5

For grit or dry mash

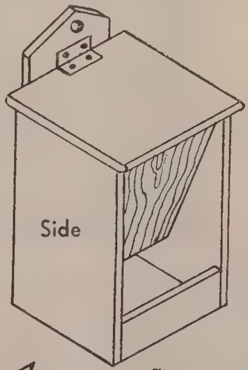


Fig. 6

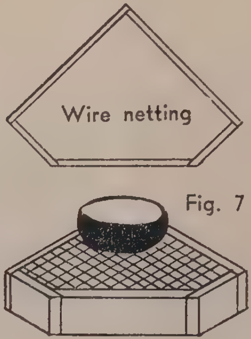
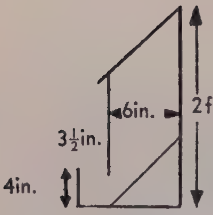
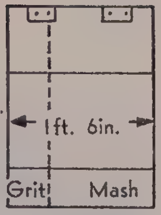

Wire netting

Fig. 7

Water stand


6in.
2ft.
3½in.
4in.

End


1ft. 6in.
Grit
Mash

Dry feed hopper

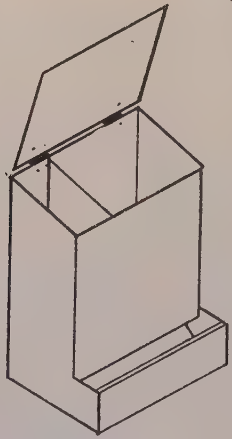
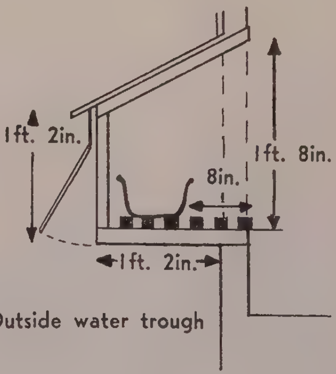
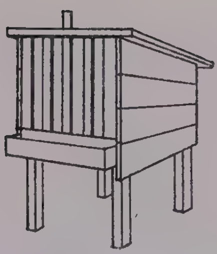


Fig. 8


1ft. 2in.
8in.
1ft. 8in.
1ft. 2in.

Outside water trough

Fig. 9



Coop for broody hen
or isolation

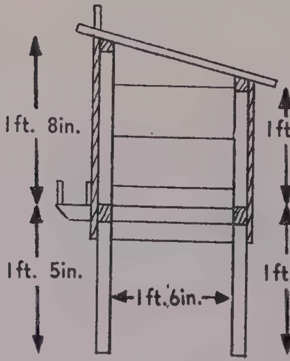

1ft. 8in.
1ft. 3in.
1ft. 5in.
1ft. 6in.
1ft. 5in.

Fig. 10

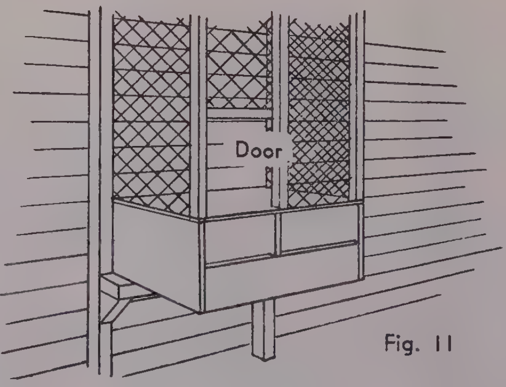


Fig. 11

Equipment for Backyard Poultry Keepers

By W. G. PROUDFOOT,

Poultry Instructor, Department of Agriculture, Dunedin

IF the best results are to be obtained from a domestic poultry flock, careful thought must be given to many details often considered unimportant. Because of the high cost of feed today the first consideration should be to safeguard against waste. Wise use of the modern equipment provided for the "backyarder" and adoption of suggestions offered by those who are experienced will be a big help toward economic production.

THE diagrams of wet feed troughs and dry mash hoppers opposite may suggest ways of improving on those in present use. Feeding receptacles must be of a shape that is not easily overturned; they must not be too small, too deep, or too large. Some householders use an old saucepan which the birds get into with the result that in a short time the mash is fouled. Others use large flat pans and much of the mash is wasted, the birds getting into it and scratching it out over the floor. Both of these common methods of feeding mash are to be avoided.

Wet Mash Trough

A useful wet mash trough is shown in Fig. 1. The construction is essentially simple, consisting only of butt joints, nailed or screwed through the end pieces, the length being adjusted to suit the number of birds catered for. Another easily made wet mash trough is shown in Fig. 3 and the section (Fig. 4), which gives suggested sizes for the use of full-grown birds. It is made in much the same way as the V trough (Fig. 1) of wood about ½in. thick. The centre bar at the top is intended to be notched to fit over the ends. If preferred, this bar might be made deeper to divide the trough into two longitudinal compartments.

Grit or Dry Mash Hoppers

Self-filling grit or dry mash hoppers are great time-saving devices. The semi-automatic hopper (Fig. 5) is primarily intended for the supply of oyster-shell (which should always be available to the birds) but is equally suitable for dry mash or pellets.

For grit the sizes given are adequate, but for dry mash, etc., the reservoir could be increased, and it could also be widened to include compartments for food and grit side by side. Fig. 6 makes the working clear. At the bottom there is a shallow trough fed by a sloping compartment or "hopper" into which the material is filled by means of a hinged flap at the top. As the trough is emptied by the birds a corresponding amount filters through from the hopper and the trough is thereby kept reasonably well filled. A wide lip round the trough will prevent waste. The box can be hung in any desired position and the reservoir capacity increased as required.

The article can be very simply made by nailing a thin back base, sloping front, and bottom strip (all seen in Fig. 5) between two square side pieces as in Fig. 6. The back projects at the top for hanging and a lid is hinged to it as shown; if desired, a small loose flap can be kept at hand to cover up or control the supply of food, etc., in the trough. Food must have an easy flow and all waste be avoided.

However, for those who are prepared to buy their equipment metal hoppers are recommended. These are hygienic and give years of service. (For example of this type see dry feed hopper on opposite page.)

Reminders for July

LAYING birds should not be coddled, even during the cold winter months. Houses should be comfortable and admit plenty of fresh air, but be without draughts. A laying house which is stuffy is likely to induce colds.

Ensure that birds are receiving adequate food and water. In districts subject to hard frosts drinking water should be thawed out as early as possible during the morning. Lack of drinking water results in the lowering of egg production.

In winter rats and mice find food scarce and therefore are on the search for palatable foods such as poultry mashes and grains. Any signs of their presence should be looked for and when noticed vermin should be destroyed before they become established.

In July the hatching of chicks begins on commercial farms. Therefore a decision should be made shortly on the replacements required.

Do not hesitate to order pullets well in advance to avoid having to accept late-hatched or undesirable stock.

Water Vessels

Special drinking fountains are of great advantage. If a vessel of water is placed on the floor, dirt or litter is scratched in to foul the water, it is often upset, and the birds walk in it, thus damping the litter; therefore, the drinking fountain should be placed on a wire netting frame above floor level (see Fig. 7).

Outside water vessels are preferable. An exterior shelter box for the water vessel can easily be built into the shady side of the house. The floor of this box should be made of slats and the box be large enough to ensure that the birds stand on the slats to drink. The drips then fall through the slats outside of the house. This method facilitates watering birds. See that the sloping roof of this box is only high enough above the drinking vessel for the hens to get at the water (see Fig. 8).

Broody Coops

A few days' confinement in a broody coop under suitable conditions will generally effect a cure for broodiness. In the coop shown in Fig. 9 the hen is well above ground level, and, being able to see her companions, she soon wants to rejoin them. The wire netting bottom provides a cool sitting place.

The coop may be roughly framed together as shown in Fig. 10. If preferred, the bottom could be formed of thin slats fixed across, with 1in. spaces between, but either method will largely obviate the necessity for cleaning the interior. A feeding trough about 18in. long and 3in. by 2½in. inside is loosely supported on the projecting ends of the middle rails. Part of this trough can be lined with zinc to form a water container, or it can be partitioned for water, food, and grit containers.

The coop is 1ft. 6in. x 1ft. 6in. x 1ft. 3in. to 1ft. 8in. high, but the sizes may be increased or a row of partitioned compartments may be built.

The slatted or wire floor can be made to slide out for cleaning. Some inches beneath the floor a removable droppings tray can be planned. Such coops may be used also for isolation and fattening.

An alternative method is to build a frame for a coop for broody birds on top of the nest boxes, thus using the nest roof as a floor, the wall as a back, and the house roof as the top. Only wire netting sides and front are then needed, but the nests must be built on a side wall of the henhouse (see Fig. 11).

Shrinking Nectar Sources

Effects of Chemical Weed Control on Beekeeping

IS the welfare of the beekeeping industry at stake with increasing use of hormone and other chemical weedkillers that are eliminating plants which are valuable sources of nectar? In this article C. R. Paterson, Apiculturist, Department of Agriculture, Hamilton, deals with the position as it appears at present and shows the important part various flowers play in the keeping of bees not only for a crop of honey and beeswax but for a pollination service of benefit to the whole community.

WITH the rapid advance made in chemical processes over the last few years changed conditions in methods of carrying out much of the country's daily work are inevitable. The farming community have not been slow to appreciate the value to them of weed control by chemical means. The argument is that if more grass can be made to grow in place of all the weed growth that covers many parts of the country, all benefit by this increased production. The use of hormone sprays and chemical weedkillers so far has shown such promising results to the farmer that this line of attack on unwanted weed growth is likely to become an established practice.

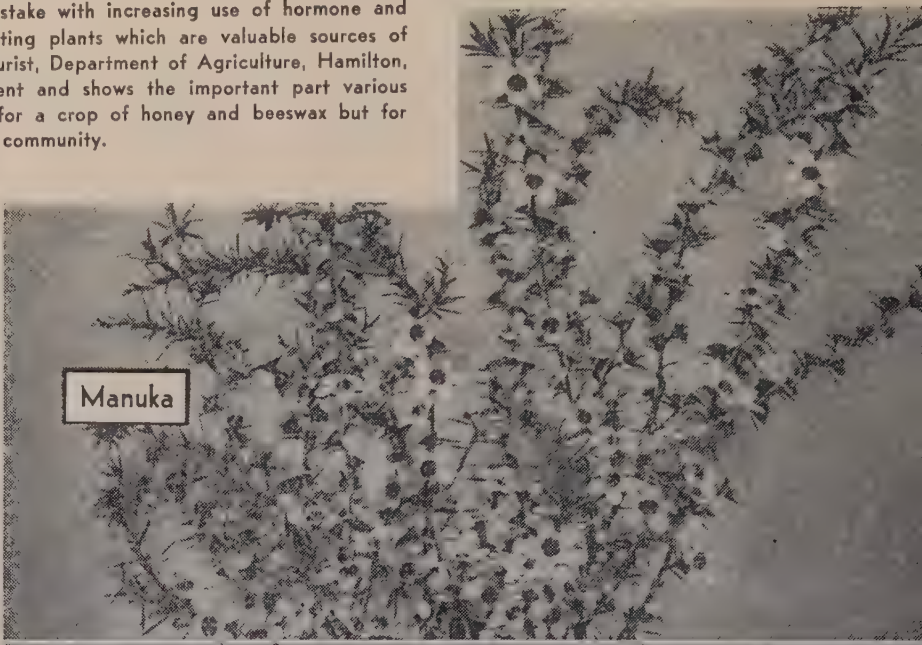
The beekeeping industry may be adversely affected by increasing use of hormone sprays and other chemical weedkillers. Plants also are being sprayed with chemicals which are highly toxic to bees and already several beekeepers have had severe hive losses. Though this is serious and calls for more thought and cooperation on the part of those applying chemicals, it is the over-all picture that should cause most concern to the beekeeper. How is apiary management to be re-adjusted to meet the loss of many valuable nectar-bearing flowers? A clearer appreciation of the position should be gained from the graph on the opposite page.

The graph shows the normal population cycle of a hive of bees and the part various plants play in supplying nectar at very critical periods. A good surplus crop can be secured only by the beekeeper manipulating and feeding his colonies to produce the maximum number of bees for the main honey flow, which is generally when clover comes into flower.

Bees Unique as Pollinating Force

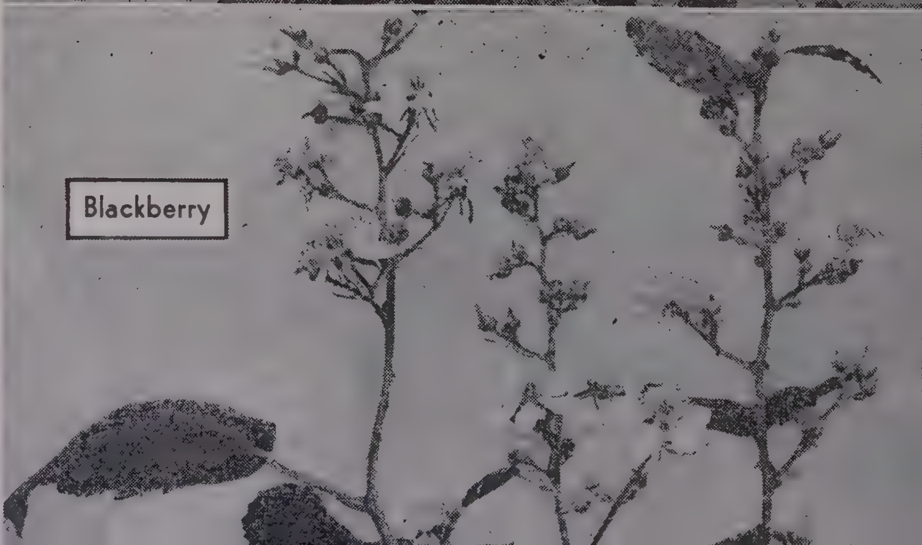
Bees do not hibernate like many other insects, such as bumble bees or wasps. The colony strength is reduced in autumn to perhaps approximately 5000 bees and the queen and these remaining bees form themselves into a winter cluster within the hive, using sufficient stored honey to maintain life.

When spring comes life in the hive becomes apparent and there is an urge



Manuka

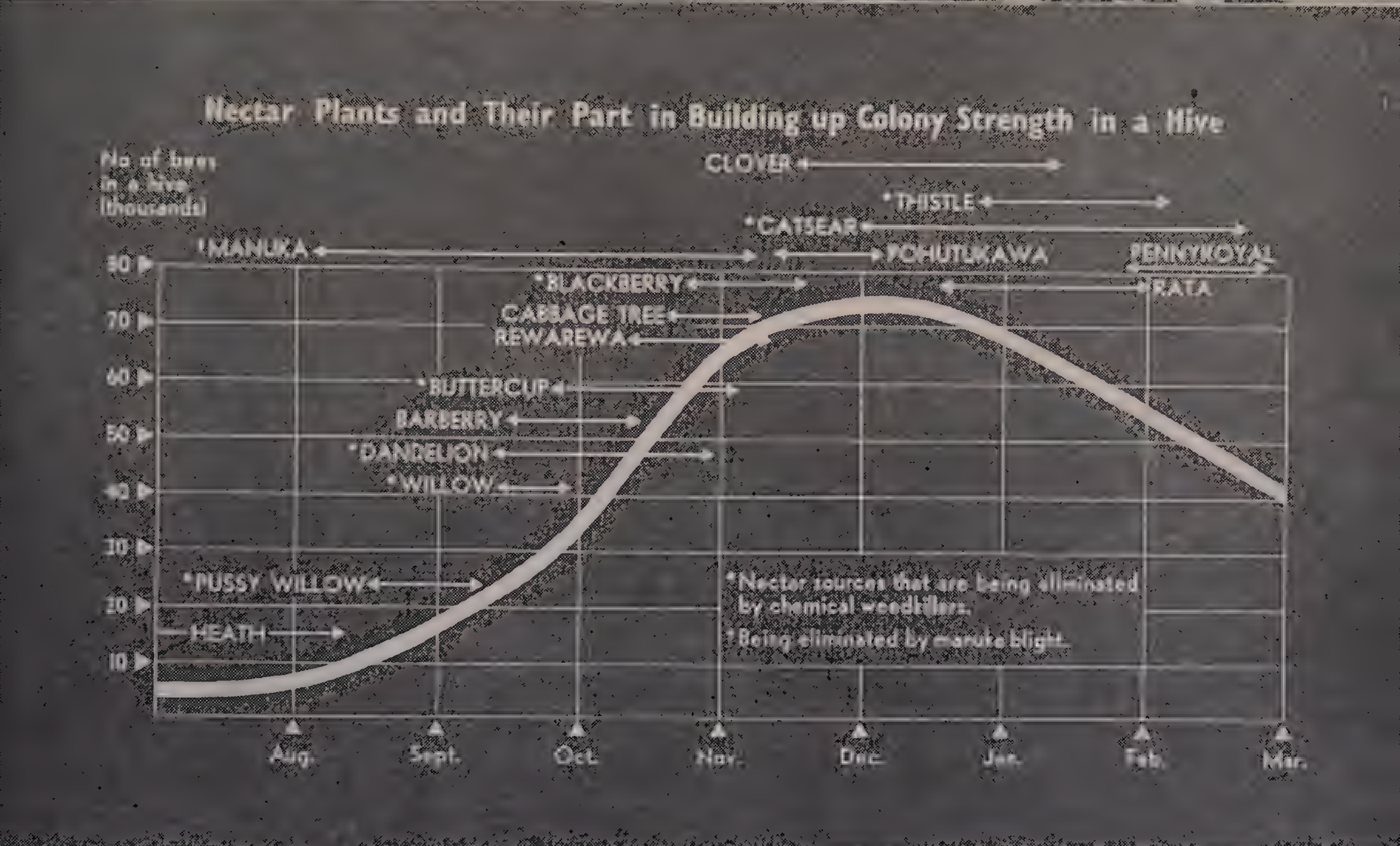
Dandelion



Blackberry

Buttercup

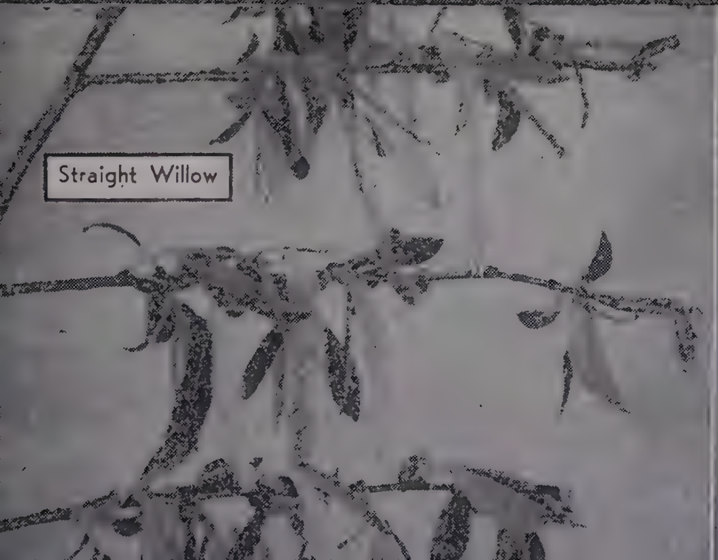
Scotch Thistle



Nectar Plants and Their Part in Building up Colony Strength in a Hive

*Nectar sources that are being eliminated by chemical weedkillers.

†Being eliminated by manuka blight.



Straight Willow

Pussy Willow

to get busy. At this point the beekeeper takes a hand. He knows that the bees that have come through winter would not have sufficient numbers to bring in a good crop of honey, and in any case most of them would die before the main crop came along. It is therefore essential for him to see that the hives are built up in colony strength. By hive manipulation, supplementary feeding, and requeening during the breeding season he is able to encourage the production of large numbers of bees. This is the reason why the honey bee is such a valuable pollinating agent.

It is to the beekeeper's benefit to see that his hives are built up to strength in spring. This does not apply to other insects, which could be quite satisfactory pollinators if they were present in sufficient numbers. Some seasons they would be available in large numbers, but in others, because of an adverse winter or other cause, the population would fall to levels that might take several seasons to rebuild to normal. The growers of seasonal crops which depend on insects for pollination would therefore be in a very uncertain position. The common bumble bees come into this group; in some seasons they can be seen in large numbers and in others very few can be found.

The beekeeper in seeing that his hives are building up in strength is not only providing the means for the production of a good crop of honey for himself, but is making available a force of pollinating agents each year for the benefit of all. This building up of colony strength is helped considerably by the abundance of spring and early summer nectar-bearing flowers as shown in the graph.

Sources of Nectar Affected

As the result of use of hormone sprays or other chemical weedkillers the following flowers are likely to be less common in future:—

Dandelion (*Taraxacum officinale*) provides a valuable source of nectar in spring.

Pussy willow (*Salix caprea*) provides nectar and pollen in early spring. In some counties this willow has been declared a noxious weed.

Straight willow (*Salix fragilis*): This flowers early in October, the period coinciding with a general increase in bee strength within the hive. Therefore if weather conditions are favourable, a considerable amount of nectar and pollen can be secured from this source, which is often valuable for the replenishing of depleted winter stores. Already many miles of riverbank where willow abounds have been sprayed from the air with hormone spray and destroyed.

Buttercup (*Ranunculus* spp.): This plant provides nectar when hives are almost reaching their peak in colony strength. Under normal conditions large crops of honey can be produced from this source. The honey is dark, but blends well with the lighter honeys.

Blackberry (*Rubus* spp.): In many parts of the country this is a most valuable nectar-bearing plant. It flowers when hives are at their maximum strength and produces a water-white honey of excellent flavour. The loss of large areas of blackberry through spraying will reduce honey yields very considerably to many beekeepers.

Thistles: These provide nectar in late summer just when white clover starts to taper off. They produce water-white honey of mild flavour. Large crops can be secured from this source.

Catsear (*Hypochaeris radicata*) **and other flat weeds:** These have a very long flowering period from early December to late March. The yellow flowers of catsear can be seen all over the countryside and the honey is bright yellow and of good flavour.

Manuka Blight

Another plant which has played a very useful part in beekeeping is manuka (*Leptospermum* spp.). The honey from this source has a jelly-like consistency and is extremely difficult to remove from the combs. It also has a flavour that is perhaps too strong for many honey eaters. The result is that large quantities of this honey are used for winter and spring stores. The manuka that has covered much of the hillsides in many areas is now being attacked by manuka blight and left denuded of foliage and charred black as if a fire had swept over the area.

Maintaining Production

With the possible loss of greater areas of the valuable nectar sources mentioned how can the beekeeper maintain his part in the economy of the country? The bee population must be maintained at a high level to provide ample pollinators, as other insects are too unreliable. It is also desirable that the production of honey and beeswax be kept high to enable the beekeeping business to meet the demand for these products. The beekeeper has two alternatives if he wishes to maintain his bees for maximum production:—

1. Reserve part of the surplus crop for early spring feed; that is, increase the amount of winter stores. Whereas 40lb. to 50lb. of honey has been considered ample for a normal colony, 25 per cent. more than this may be needed. A more expensive means of overcoming the use of such large amounts of honey is to use sugar during the period that the colony is building up. Sugar, though useful for stimulating brood production, is not considered as good as honey where large amounts have to be fed.

2. Establish at least one apiary close to a native bush area, where various kinds of nectar-producing flowers are to be found. [The value of bush apiaries was emphasised by J. E. Rodie in last month's issue of the "Journal".] These flowers supply nectar from early spring until well into summer. Where apiaries are placed out in special areas for feed honey they should preferably produce a honey not suitable for marketing but quite suitable for feeding to bees. Experience in operating bush areas has shown that at times exceptionally high-quality honey is produced. In a way this is unfortunate, because the temptation is to market this honey, thus defeating the purpose for which the apiary was established. Recently the author saw some of the choicest section honey produced from a bush source. The wax cappings were white and the honey water white and of mild flavour.

Some of the many nectar sources to be found in native bush are rata, rata vine (red and white), bush lawyer, fuchsia, tawari, hinau, kamahi, rewarewa, mahoe, and koromiko.

Conclusion

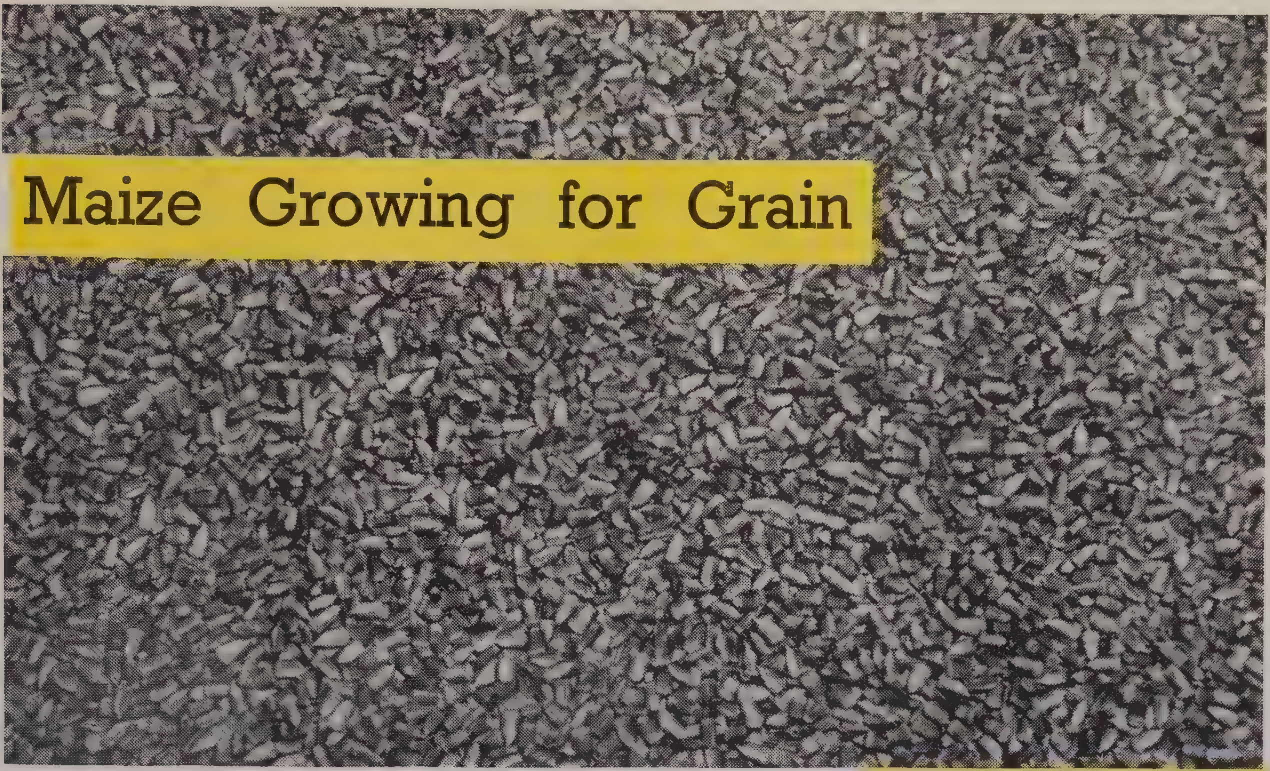
Though the views expressed about shrinking nectar sources may appear to many to be rather pessimistic, beekeepers should study present trends and analyse their possible effects in the future. Only after a nectar source has disappeared does the beekeeper usually realise how valuable it was.

The scientific control of many plants and weeds has become an established commercial undertaking. The beekeeping industry will therefore require to take notice of what is happening and make preparations for a change in apiary management if the need arises.

PLANNING, BUILDING, AND WORKING CATTLE YARDS

A new Department of Agriculture bulletin "Cattle Yards" gives very full details of the planning, building, and working of yards, with over 60 illustrations and diagrams. Emphasis is placed on ways of achieving economy in construction yet not stinting the features on which efficiency of working chiefly depends. Copies of this bulletin are available free from offices of the Department of Agriculture.

Maize Growing for Grain



Grains of Wisconsin 643 maize.

By H. de O. CHAMBERLAIN,
Instructor in Agriculture, Department of Agriculture, Gisborne

NEW ZEALAND could profitably use each year the produce from some 15,000 acres of maize as grain for stock food. This grain has become increasingly popular in recent years, particularly for fowl feed, yet the area, which was about 8000 acres in 1946, has steadily declined over the past 10 years to some 3000 in 1955. This decline has taken place despite the fact that during this same period mechanisation of planting, cultivation, and harvesting, together with weed control by hormones, has been developed perhaps more with this crop than with other grain crops, thus reducing the labour requirement considerably, and the introduction and general use of double hybrid seed have resulted in increases in yields of up to 30 per cent. The growing of maize, harvesting and storage of it, control of diseases and pests, and uses for it on the farm are dealt with in this article, which will be concluded in next month's issue of the "Journal".

GOOD maize crops for grain cannot be grown everywhere in the country, but there is considerable scope for an increase in acreage in those districts which can provide the main requirements of this cereal. These are fertile, well-drained soils, a long, frost-free growing period from October to late April, and climatic conditions which provide for a rapid warming of the soil in spring to give the young plants a good start. These conditions are to be found in parts of coastal Hawke's Bay, Poverty Bay, the Bay of Plenty, and on the more fertile drained swamp lands, river flats, and volcanic soils of North Auckland.

Maize is the highest yielding of all the cereal crops grown in New Zealand, yields of upward of 120 bushels per acre being common where the crop is grown under suitable soil and climatic conditions. With gross returns of over £60 per acre maize can be a very profitable crop, even though production costs are considerably higher than for other cereals. A review of maize growing in the various districts where it can be grown successfully indicates that for various reasons yields too often are well below what could be expected and this is one of the main reasons for a decline in the acreage. To assist growers toward better yields, better-quality grain, and lower production costs per bushel of grain this article deals with the main requirements for good maize crops.

Place in Rotation

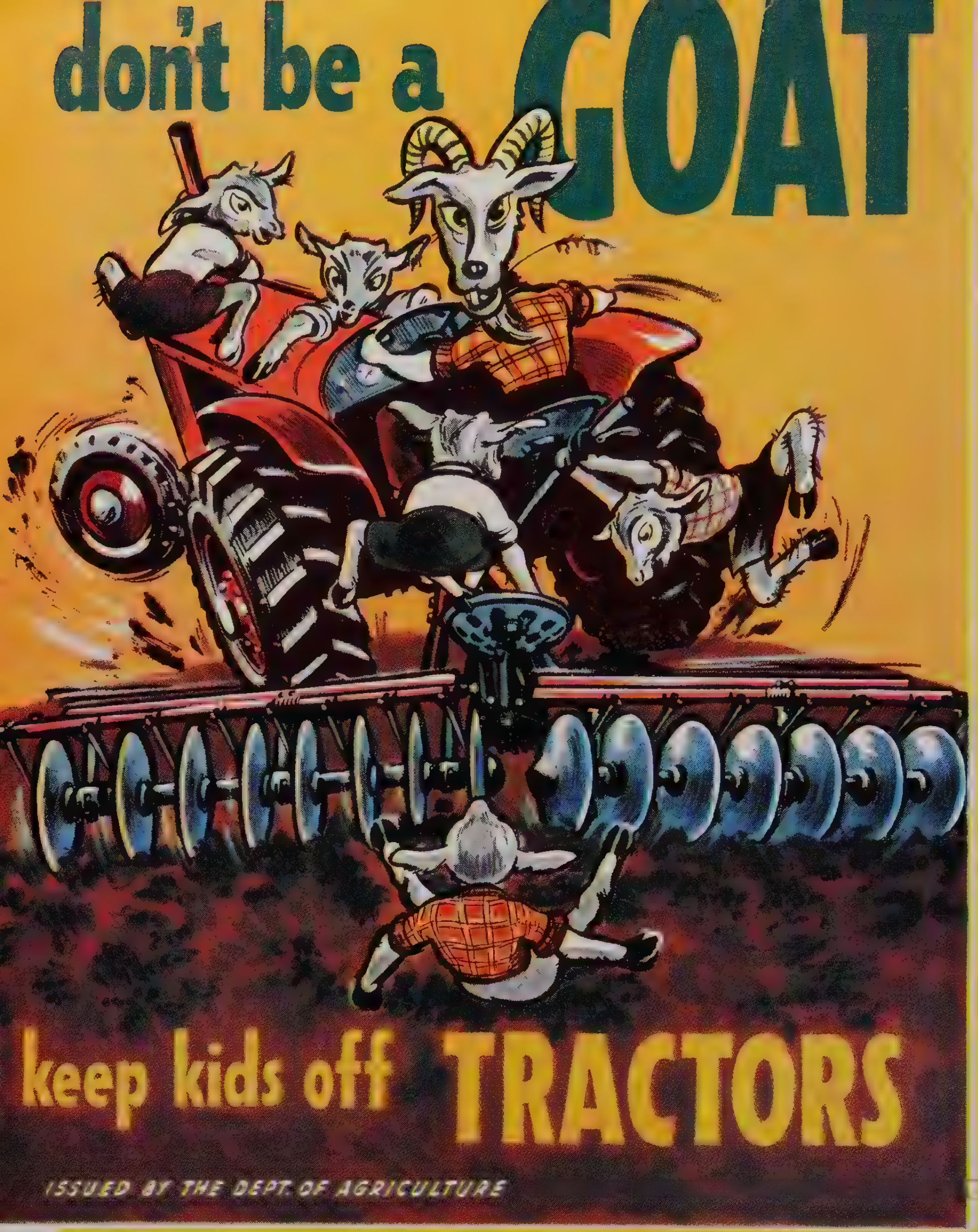
Maize is generally grown in districts where no strict rotation of crops is followed, but for good results certain general rules can be observed which will assist in getting better yields. In the first place maize is a gross feeder and requires high fertility for good crops. It is a good crop to grow after grass on fertile soils, and if adequately manured and kept free of disease, can be grown successfully for up to 5 to 6 years in succession, but there is a limit to the number of good crops which can be grown on even the best of soils.

Continuous cropping with maize has done much to spoil the texture of soils, has increased weed population to excessive proportions, and has resulted in many cases in building up a heavy infestation of various fungous diseases which not only affect the crop in the particular paddock but are a source of infection in adjoining areas.

Crops such as peas, beans, and pumpkins or chou moellier should be taken after grass and these crops followed by the maize crop. On the other hand it is best to grow other cereals such as barley after maize, since they tend to harbour and increase some disease spores which can severely injure maize.

Selection of Areas

Maize is a heavy feeder and should be given the richest paddocks available. Poor soil will produce low-yielding crops even when heavily


don't be a GOAT
keep kids off TRACTORS
ISSUED BY THE DEPT. OF AGRICULTURE

Another

19

People were KILLED on Tractors last year

(14 Adults, 5 children)

●

OUR UNENVIABLE RECORD

		Total deaths	Children
1949	—	8	
1950	—	18	
1951	—	12	
1952	—	25	6
1953	—	17	1
1954	—	20	1
1955	—	19	5
		119	13

119

Tractor Fatalities in 7 Years

13 of Them Children under 15 Years of Age

Child deaths on tractors are again on the increase. Only unremitting care on the part of those in charge of farm tractors can reduce this terrible toll of life. Young children must not be allowed to drive or ride on farm tractors.

DON'T SAY: "IT CAN'T HAPPEN ON MY FARM"

Remember: "These children are our next farming generation."
"We can't afford to lose these valuable lives."

fertilised with artificial manure. River flats are the ideal situation, but any fertile soil which is well drained will produce good crops. On dairy farms an old night paddock or well-drained swamp land is excellent.

The area must be frost free from October to the end of April or at least subject to frosts no heavier than 8 degrees F. in autumn and frost free in spring. After April, when the cobs are mature, heavy frosts will help rather than hinder the harvest.

Though aspect of land and degree of protection from winds have some bearing on production of the best crops, good drainage is the only really important factor other than rich soil. This ensures not only the essential quick warming of the soil in spring and prevention of loss in the seedling stage, but suitable conditions for harvesting by machinery without undue delay by heavy rainstorms in autumn and winter.

Early ploughing of stubble is essential.

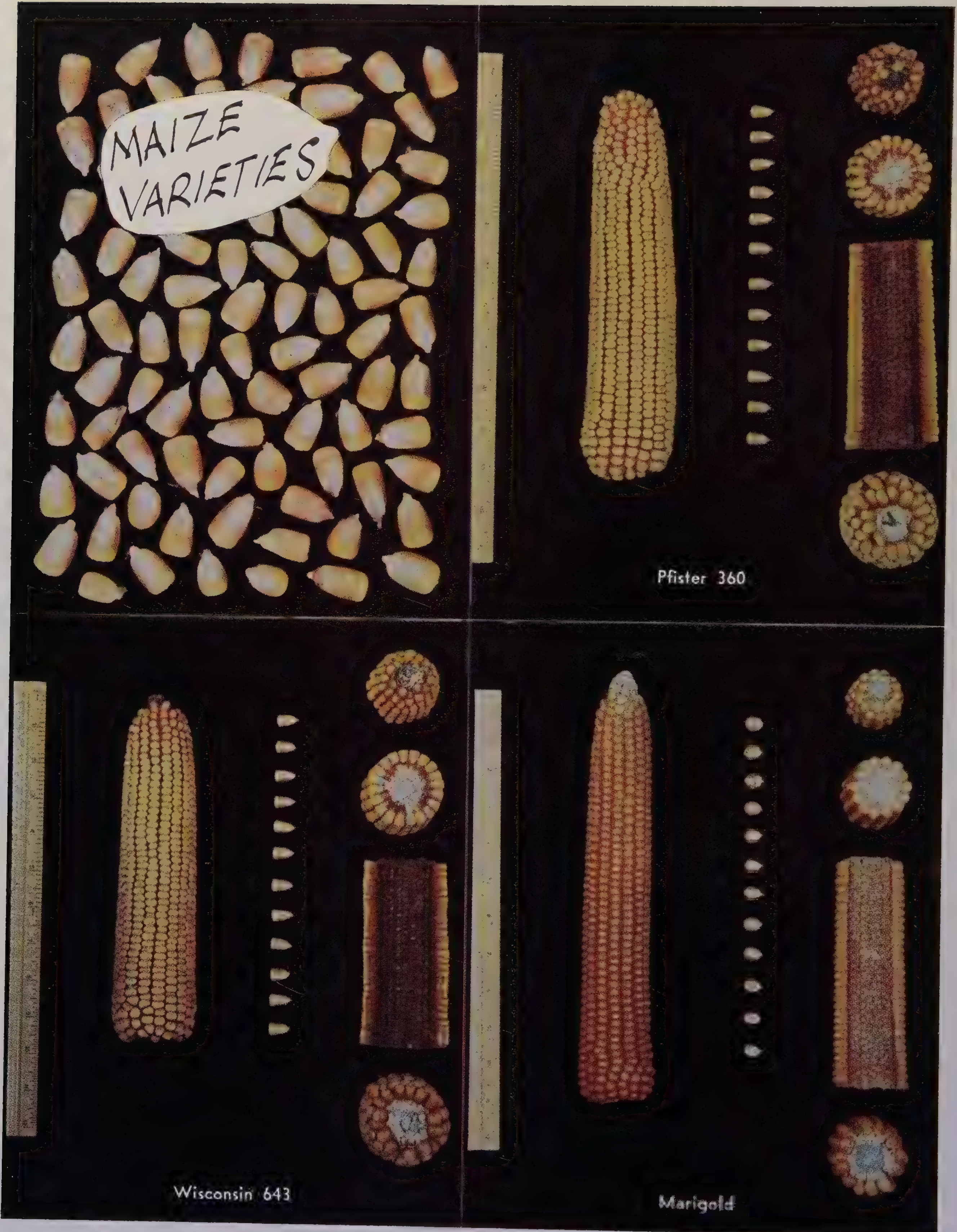
Preparation of Seed-bed

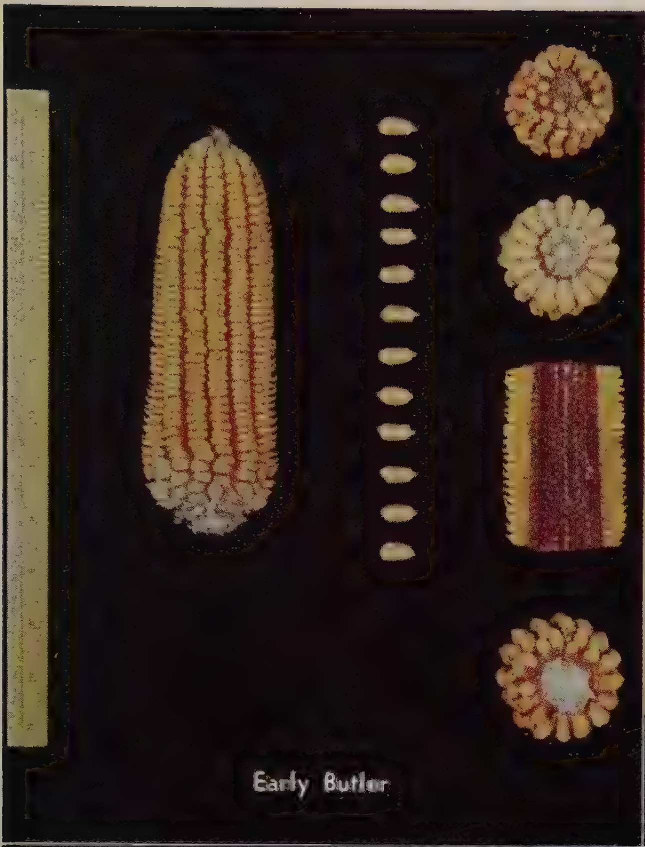
In preparing for maize the aim should be the best possible conditions of tilth by the time the seed is to be sown. This entails thoroughness in every operation of cultivation. Thoroughness in its turn calls not only for efficiency in the actual performance of ploughing, discing, harrowing, and other working, but provision of ample time for each phase of cultivation to play its part to the fullest extent. Ploughing is frequently delayed until a week or two before sowing, with consequent hurried and inefficient after-cultivation and the inevitable loss of germination, slow initial growth, and loss of seedlings.

Grass paddocks should be heavily disced about April to cut the turf and give it a chance to die. Three weeks should elapse before ploughing, to encourage the germination of any weed seeds on the surface. Deep ploughing, up to 6in., should follow and the land left up to mellow during winter. If the area was in maize the previous season, the stubble should, if possible, be burnt with a flamethrower to reduce its bulk and destroy fungous spores. This is not a difficult or an onerous job, as the maize leaves dry quickly after rain in even a light breeze. Deep ploughing should follow immediately and the land be left to fallow.

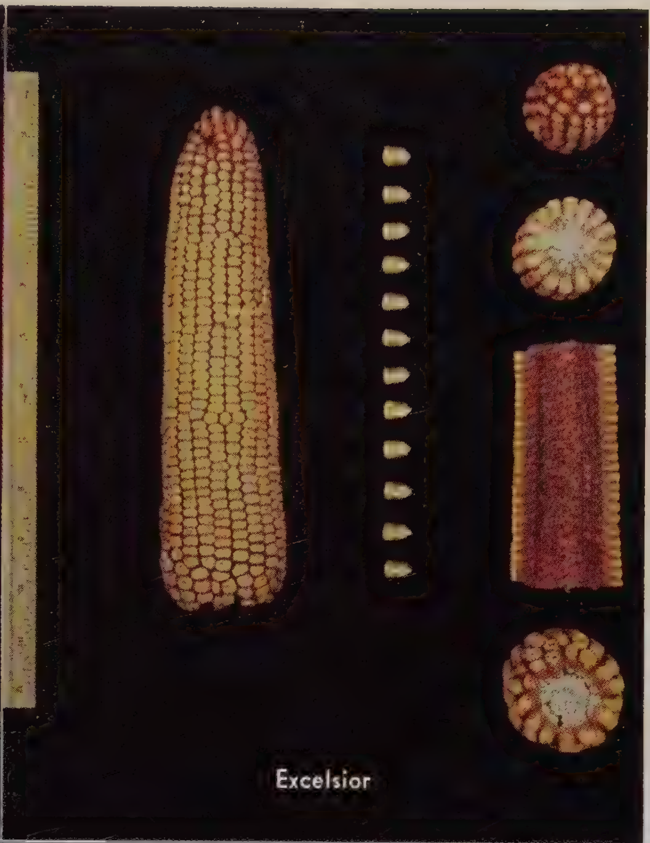
The land should again be ploughed to a depth of at least 4in. as early as possible in September and disced to a reasonable tilth to allow weeds to germinate. Rollers should not be used

Land for maize receiving a second discing after ploughing.

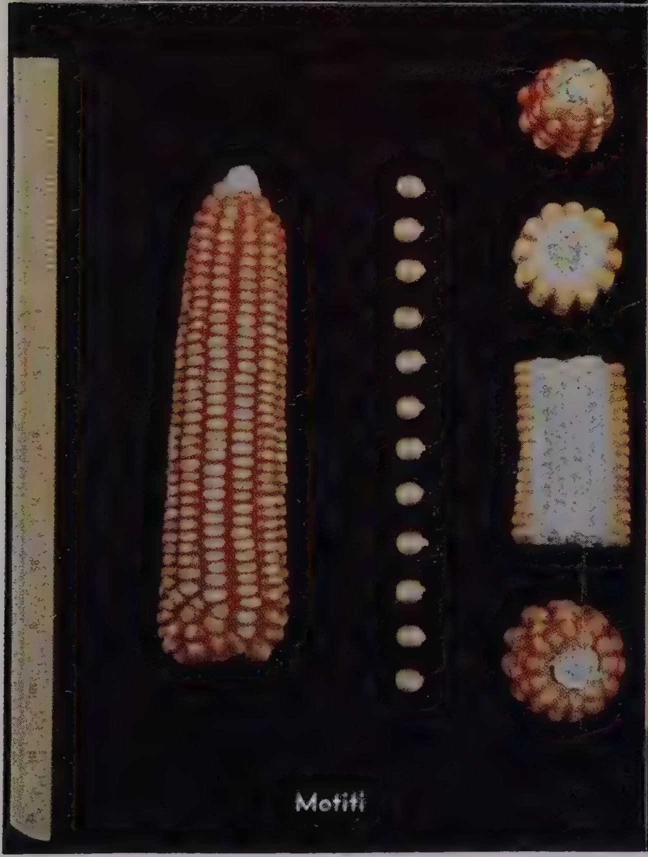

MAIZE VARIETIES
Pfister 360
Wisconsin 643
Marigold



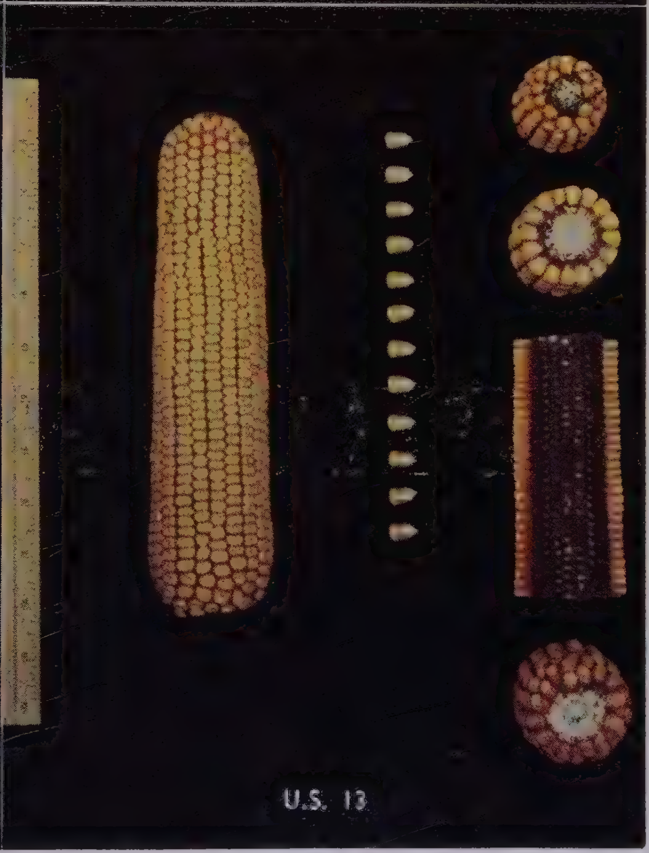
Early Butler



Excelsior



Motiti



U.S. 13

REMEMBER

The use of TVL Combined Blackleg-Pulpy Kidney vaccine makes it possible to protect sheep against both blackleg and pulpy kidney with less handling. This vaccine has been concentrated so that a 5 c.c. dose is as effective as the recommended doses of both vaccines when injected separately.

to PROTECT

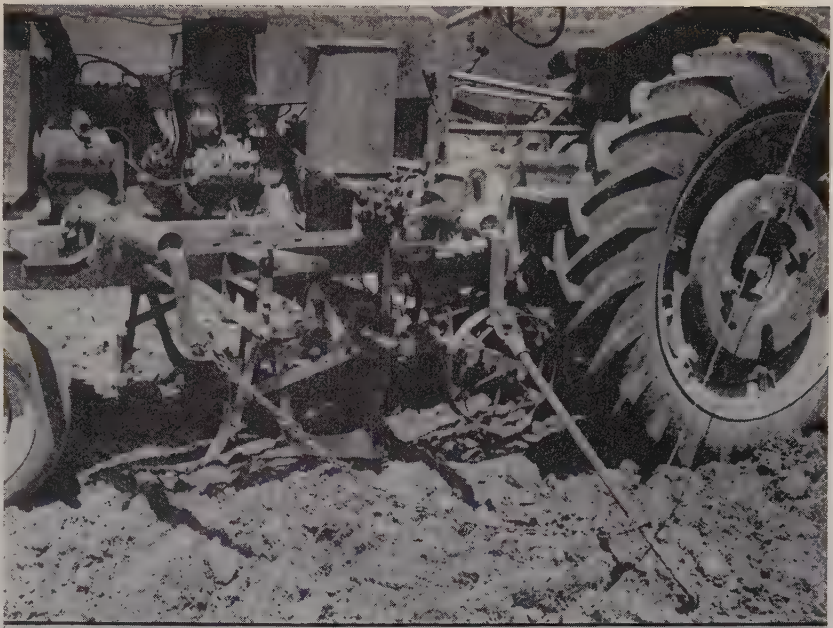
Where losses from blackleg or pulpy kidney are anticipated in hoggets or older sheep on winter feed, one dose of Combined Blackleg-Pulpy Kidney vaccine will protect them against both these diseases. At the same time, previously unvaccinated ewes will have received the first dose of Pulpy Kidney vaccine which is necessary if you are to derive the full benefit from their pre-lambing or "booster" dose of Pulpy Kidney vaccine when they are subsequently mated.

TVL

TASMAN VACCINE LABORATORY LIMITED

on heavy land, and cultivators, harrows, and discs should be used to gain the necessary fine tilth to the full extent of the plough depth. For the last 2 to 3 weeks before sowing harrows only should be used to control weeds and gain consolidation.

No amount of cultivation after the crop is sown can make up for deficiencies in the preparatory work. In fact, efficient harrowing after the crop is sown becomes impossible if the seed-bed is cloddy or trashy.



Two - row, tractor - mounted maize → planter.

Time and Rate of Sowing

Irrespective of district the time to sow is governed by the weather. Generally from October to mid-November is best, but sowing in cold, wet soil will certainly reduce germination and increase seedling loss through disease. Moreover, crops sown under these adverse conditions will not ripen significantly sooner than those sown later when soil warmth and soil moisture are right. If cultivation has been well done and the seed-bed is fine and firm, the soil will not dry out below a depth of 2in., which allows plenty of moisture for seed planted 4in. deep.

Throughout the maize-growing districts the rate of seeding varies between 12lb. and 18lb. per acre, the average being 14lb. However, if the soil is in good condition for sowing, both as regards warmth and tilth, 12lb. of seed per acre is ample. A slightly higher seeding rate is required when larger seed is used.

Trailer-type 4-row planter operating → on well-prepared seed-bed.

Method of Sowing

Seed is sown in rows from 30in. to 36in. apart, depending chiefly on the type of planter used, and the seed is dropped 9in. to 10in. apart in the rows. Today almost all crops are sown 4in. deep in continuous rows with 2- or 4-row maize planters. Check planting, which is a method of sowing the seed in squares by machine to facilitate weed control, has practically disappeared with the advent of modern weed control measures.

However, for small areas which it is desired to sow by hand the planting of maize "on the square" is still the best method. It is done by drawing a sledge with runners spaced 3ft. apart or some other form of marker in a series of parallel lines across the paddock and crossing these lines at right angles. The seed is dibbled in at each intersection of lines, three seeds to each, and the resulting plants are thinned out to two.

With machine sowing care should be taken to fit the right plates for the size of seed being sown. Seed size varies from year to year and from variety to variety and usually two or three sizes are sold. If the same plates are used every year irrespective of seed size, the seeding rate may vary considerably and also establishment may be very patchy.

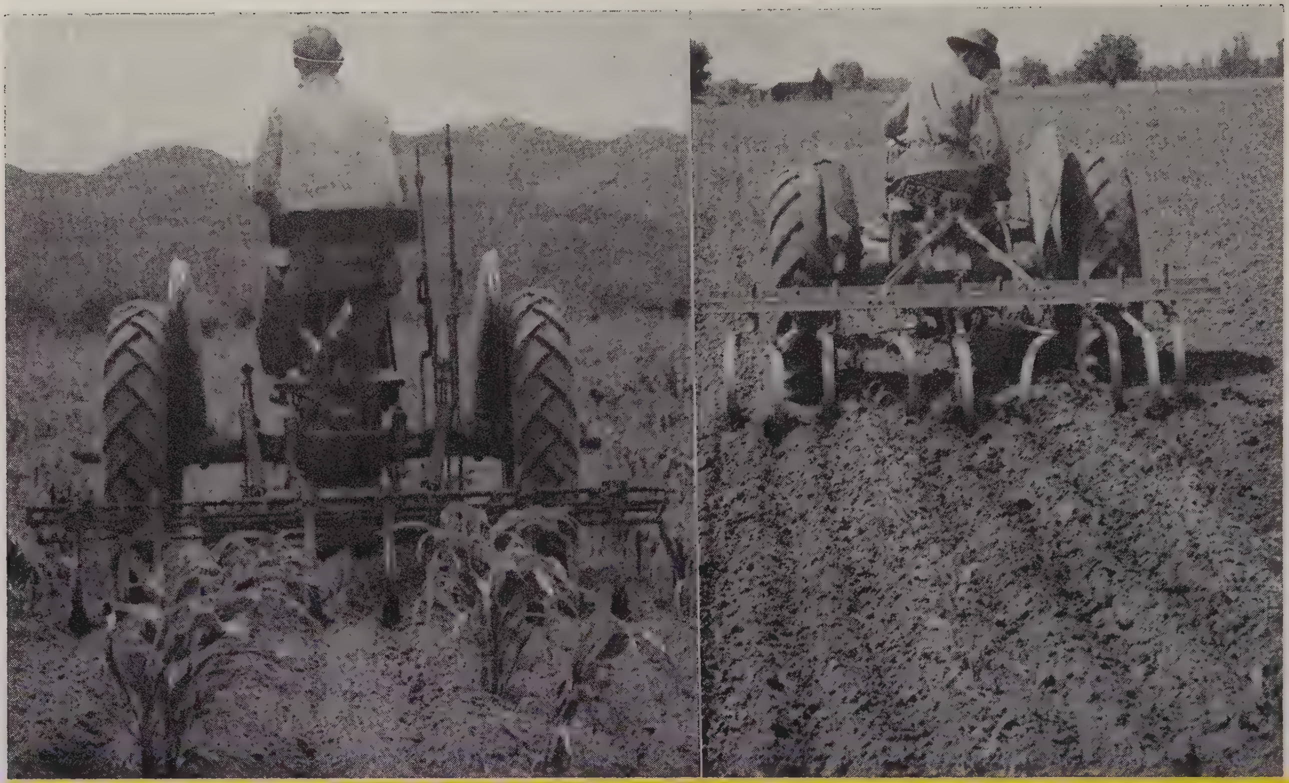
Dual Cropping

At one time the dual cropping of maize and pumpkins or kumikumis was popular. It has disappeared from the Gisborne district, as weed control in maize with sprays is almost impossible, since these kill pumpkins.

At best this dual cropping is a poor practice, usually making for inferior crops of each type, because each requires different cultivation practices. It is true that in the event of the failure of one of the crops the other will probably do well, but the growing of each crop alone in a separate area is better. If maize is to be harvested by machine, mixed crops cannot be used.

Varieties

In the Gisborne district the largest area is sown with the double hybrid Wisconsin 643 grown from seed



Inter-row cultivation. Left—Stiff-tine cultivator. Right—Spring-tooth cultivator.

produced by the Department of Agriculture, which has largely replaced Pfister 360, the hybrid first marketed by the Department.

A few areas are sown with various hybrids imported direct from America by seed merchants, and for a few crops Marigold, a variety which is becoming rare, is sown.

In the Bay of Plenty and South Auckland districts some Pfister 360 is grown, but as the grain is mainly fed to stock without being shelled from the cob, yields are not given much notice and open-pollinated varieties are still widely used, the most common being Early Butler, Excelsior, and Motiti.

Brief descriptions of varieties follow:—

Pfister 360: A high-producing double hybrid with an average height of 5ft. to 6ft. Leaf development is fair, but stems are somewhat weak. Cobs are of medium length and well packed with small, hard grain with a smooth, yellow dent. They are set fairly low on the stalks. It can be husked and shelled very easily and care must be taken in handling. Because the cobs shed much grain in the crib and so fill up spaces between cobs, drying is often delayed, with a consequent increase in mould, especially in a season that is unusually humid. To offset this reduction of air movement triangular wire mesh tunnels should be spaced through the crib to give extra access to wind. The variety matures in about 180 days.

Wisconsin 643: This double hybrid promises even higher yields than Pfister 360. Its average height is 6ft. to 7ft., leaf development is good, and stems are strong. Cobs are of medium length, but are very well packed with larger, though softer, grain than Pfister 360. Cobs are heavy for their size and shell out very well; they grow well up on the stem. Shelling and husking are easy, provided the crop is ripe when harvested. Difficulties in machine husking are always caused by picking at an immature stage. The grain does not shed from the cob in the crib, which makes crib drying easier and more efficient. The variety matures in about 190 days.

Marigold: An open-pollinated variety used mainly for greenfeed, it is very leafy and vigorous. Though stems are fairly hard, they tend to be brittle and to lodge in high winds. The grain is bright amber, fairly small, and flinty. The husk is very tight and gives cobs good protection in the worst of weather. It is accordingly very difficult to husk by machine. Cobs are long, slender, and well packed with grain. The variety matures in about 210 days.

Early Butler: An early maturing, open-pollinated variety which nevertheless yields well. Stems are about 5ft. high and of medium thickness. Cobs are of moderate size with very deep yellow grain. The dent on the grain is drawn out in a distinct beak, causing the mature cob to be extremely rough. For this reason it is unpopular with hand pickers. The variety husks well, but the grain is soft and susceptible to crib rot. The variety matures in about 135 days.

Excelsior: A tall, open-pollinated variety with stout stems that stands well. As leaf development is good, it is useful for greenfeed. Cobs are large and weighty with medium size yellow grain having fairly smooth dents. Husks are tight and close, which makes machine husking difficult. The variety matures in about 210 days.

Motiti: This open-pollinated variety is so called from its association for many years with Motiti Island in the Bay of Plenty. The variety has short and light stems and tends to sucker freely. The grain is very hard and resistant to mould. Yield is light and maturity occurs in about 140 days.

Poor cultivation after late ploughing caused this weed infestation.

U.S. 13: This is a very vigorous, stiff-stemmed, high-yielding double hybrid; seed of it has been imported from the U.S.A. It grows up to 10ft. high and matures very late. The grain is very similar to that of Wisconsin 643, but inclined to be larger and harder. For grain growing in districts where the cobs are fed unshelled direct to stock this variety may be excellent. In the Gisborne district it has been unreliable, owing to its late maturity, an early and quite light frost preventing the cobs from turning downward. This allows rain to get beneath the husk and collect about the base of the cob, causing sprouting of the grain before harvest.

Yields

The average yield of shelled grain in New Zealand is 60 bushels per acre, but in the Gisborne district better cultivation and weed control methods plus the use of double hybrid seed have raised the average yield there to between 90 and 100 bushels, and crops yielding 120 bushels per acre are not uncommon.

With the introduction of the hybrid W643 with its greater resistance to disease and bad weather a further increase in the district average within a few years would appear possible.

Manuring

On the Gisborne plains at present no fertiliser is sown with maize and, in fact, though some increase is obtained from manures on the richer river flats, it is not sufficient to pay for the cost of application. However, on the lighter soils there, on the Gisborne-East Cape area, and in the Bay of Plenty and Auckland districts some fertiliser is necessary to give maximum results. As maize matures in about 6 months, varying according to variety, it can make full use of the slower-acting manures. For the districts just mentioned a dressing of 2cwt. of superphosphate and 4cwt. of blood and bone per acre is recommended.

Unfortunately, though most maize planters have manure-sowing boxes, they are of poor design and do not sow blood and bone well and the maximum rate at which they can sow the mixture is about 3cwt. This necessitates the application by top-dressing or, better, side dressing when plants are up, if machinery is available, of the remaining 3cwt. of manure.

If the ground has become waterlogged after heavy winter or spring rains, there are often obvious signs of nitrogen deficiency. If also sunny days are infrequent during the first few weeks after plants emerge, temporary phosphate deficiency may also show up in the leaves of plants, even on soils known to be high in phosphate.

The yellow and rather stunted appearance of nitrogen-starved maize is distinctive and when it occurs a dressing of fertiliser of the ammonium nitrate plus calcium carbonate type at 1cwt. per acre is worth while to force growth. The improved growth-rate which results from the nitrogen dressing appears automatically to overcome the inability of the plants to take up sufficient phosphate, and root development proceeds normally.

The setback in growth from nitrogen deficiency makes plants particularly susceptible to disease and they remain longer in a condition liable to heavy damage by cutworm. Weeds also tend to grow more quickly, being less heavily shaded by the weak plants.

After-cultivation

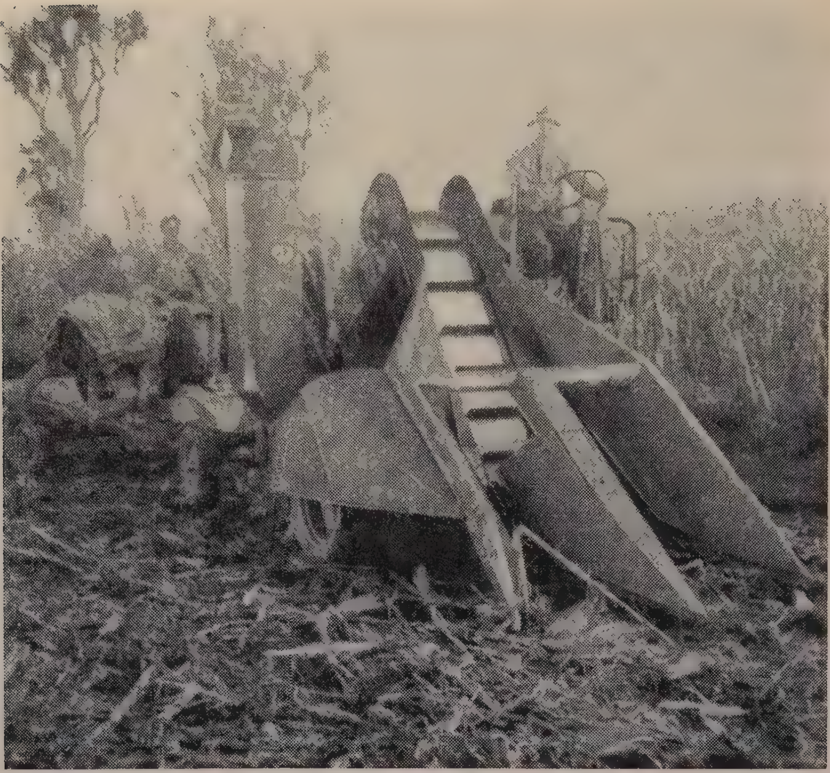
In a normal season in a good seed-bed maize takes from 10 to 14 days to come through the ground. Weed seedlings germinate much more quickly and by the time the maize is up there are thousands of small weeds above ground with tens of thousands more on their way. About 8 days after sowing, therefore, the ground should be harrowed parallel with the rows to destroy the weeds present above and below ground. As soon as the maize seedlings are above ground the ground should be harrowed again lightly. A warm day should be chosen for the job, as this allows the maize to gain 6in. or so of height before any inter-cultivation or spraying is necessary, thus preventing burying or other damage to the seedlings.

If the crop is not to be sprayed for weed control, it should be inter-cultivated for the first time when 6in. high. Though trailing cultivators are still used, by far the best implement is the hydraulic-lift, duck-foot tractor cultivator, which at this stage can be run close to the plants and quickly lifted at the ends of the rows without causing damage. This operation has a slight earthing-up effect on the plants, which tends to smother small weeds round them and to protect the roots. After the first cultivation, however, the tines of the cultivator should be drawn in to run not closer to the rows than 9in., since maize roots soon grow sideways and closer inter-cultivation tends to upset the anchoring effect given by side roots.

Three strokes of the cultivator at intervals of a few weeks are usually necessary, the first one being deep to aid admission of air to the soil and facilitate surface drainage, and the second and third being progressively shallower to prevent damage to growing roots. There is no point in cultivating for the sake of cultivating and the number of strokes should be kept to the minimum necessary to control weeds. By damaging roots and other parts of maize plants extra cultivations are likely to do more harm than good. No amount of intercultivation will ever put right any deficiencies in seed-bed preparation.

Weed Control by Spraying

Before the advent of selective weed-killers maize growers were forced into expensive hand hoeing to kill weeds in the rows. Hormone weed-killers have made this operation unnecessary, provided care is used in the mixing and application of the sprays.



Self-propelled 2-row maize picker.

Weed sprays, however, will not replace a good seed-bed and it cannot be too strongly emphasised that late and inefficient preparation of the soil before planting will affect the efficiency of weed control by spraying or any other method, particularly by making harrowing after sowing virtually impossible.

If it is intended to control weeds by spraying—and this is recommended—pre-emergence harrowing and post-emergence harrowing should be done as already described, unless the soil is so wet that it would be heavily compacted in the process.

Spraying should be done as soon as the weeds are again above ground; the earlier weeds are sprayed the more efficient will be the kill and the less likelihood there will be of damage to the maize plants. Conversely, the taller the weeds are the more difficult they become to kill and when maize is well grown the greater is the risk of spray damage.

On experience up to 1955 the amine salt of 2,4-D is recommended for spraying. No other formula has given a more complete kill of weeds at any stage, but some have shown signs of slightly greater damage where conditions have forced a late spray.

Rate of Application

A hard-and-fast rule cannot be given about the amount of spray to be used. The rate is affected by the size of the weeds, growing conditions during the season, and to some extent by the type of weeds.

If the season is moist and the weed growth rapid, rates as low as ½lb. acid equivalent per acre will effect a good kill, but if the topsoil is dry and weed growth slow, ¾lb. to 1lb. acid equivalent per acre will be required to kill weeds only 2in. to 3in. tall. Without doubt the vigour of the weeds, whether caused by the season or the varying fertility of soils, is the main factor in determining the rate of spray.

Throughout the maize-growing areas probably the most important weeds in maize are fat-hen (*Chenopodium album*), Prince of Wales feather (*Amaranthus retroflexus*), black nightshade (*Solanum nigrum*), and wild turnip (*Sinapis arvensis*). Wild turnip is killed by low rates of spray, black nightshade requires heavier applications, and Prince of Wales feather and fat-hen rates intermediate between the first two. The rate of spray must be sufficient to kill the most resistant of the weeds present.

The spray recommended for general use is the amine salt of 2,4-D at ¾lb. acid equivalent per acre in 8 to 12 gallons of water. It should be applied with a conventional boom fitted with 32F tips 14in. apart travelling at 4 or 5 miles an hour.

Spray Drift

When soil and weather are warm spray may be caught in warm air currents and drift in even the slightest breeze to the detriment of spray-susceptible crops nearby. To avoid this, spraying in warm weather should be done either before 9 a.m. or late in the evening and low-pressure spraying only should be used to create a droplet size sufficiently large that spray does not become airborne.

Cultivation after Spraying

There is no value in intercultivating maize except for weed control. Provided weeds are effectively controlled by spraying until the plants are tall enough to shade the ground, no further cultivation other than a final moulding up of soil against the plants is necessary. This final cultivation and moulding should be delayed until the maize is almost too tall and thick for the passage of the implements.

The moulding should consist of throwing about 6in. of soil against the bases of the plants. This helps to anchor them against the wind and later assists in the easier lifting of any fallen stalks by the picker. The growth of the plants and the shade of the leaves will take care of weeds from this stage on and the crop needs no further attention until harvest time.

Harvesting

In a normal season maize is harvested between April and the end of June. Small areas in the Gisborne district are still harvested by hand and elsewhere fairly large areas are harvested in this way. Hand-picking gangs work on a contract basis which usually provides for the cobs to be picked, husked, and bagged, cartage to cribs being provided by the grower.

For this method of harvesting it is better, where possible, to delay harvesting until frosts have occurred, because these tend to make the stems more brittle so that the cobs come away freely.

Machine picking is done by single-row or 2-row pickers, which strip the cobs from the plants, remove the husk, and deliver the cobs free from extraneous matter to a tractor-trailer or lorry moving alongside. Each picker is served by at least two and sometimes three lorries or tractor-trailers to ensure that as soon as one is loaded an empty one takes its place.

The contract price for machine picking in 1955 was £6 per acre, the farmers being responsible for cartage to cribs.

Trees on the Farm

Planning for Tree Planting

WHAT prompts a landowner to plant trees? The majority do it because of a need for shelter from wind or sun for their homesteads, stock, or crops; some prudent ones plant to grow for themselves the wood required on a farm; some others, equally prudent, make full use of their land by planting hard-to-farm areas with a profitable tree crop; and a few plant trees for beautification or for the sheer love of trees. Whatever the purpose the need for planning is stressed in this article by W. H. Jolliffe, Extension Forestry Officer, New Zealand Forest Service.

Tall trees (*Pinus muricata*) planted too close to a highway and a power line. They now have neither use nor beauty.

THE planting of trees for whatever purpose requires more careful planning than any other farm operation except the siting of the homestead. Considerable preparation is required, and on top of this trees take so long to fulfil the purpose for which they are grown that mistakes in siting, in choice of species, and in planting and tending techniques can cost much in time and money. All that is necessary is some careful thought based on observation of the needs and capabilities of the property, and perhaps a little advice on the species to be used if those already thriving in the district are not considered suitable.

Shelter

Provision of shelter from wind cannot be made properly without careful observation of the needs of any property. If the growing shelter trees are to thrive, belts must be fenced against stock and vermin, and it is unwise to be niggardly over the space allowed for side growth. The pains that must be taken to ensure a good plantation are justified only if the best possible type of shelter is established. As wind is prevalent in all seasons, the choice of species will usually be from among the evergreens, especially those which maintain a dense, leafy habit. The main exceptions to this rule will be about orchards and summer crops, where poplars have been popular.

Tall trees should not be planted too close to houses, to power and telephone lines, to public roads, or near aerodromes. There is legal provision for abating dangers and nuisances caused by trees in wrong places, and topped or otherwise mutilated trees are not at all beautiful and often their use is impaired.

Shelter from sun suggests a choice of deciduous trees whose branches in winter will not greatly impede the weaker, winter sunshine. However, the copious leaf fall of such trees may make them totally undesirable in some situations.

Material for the Farm

Requirements of forest produce will vary from farm to farm and from one locality to another, but all farms need firewood, posts, strainers and battens, and timber for gates, for new structures, and for the repair of old ones.

An example of some of these requirements being satisfied by home-grown produce occurs in the Wairarapa. A sheep farm in that district has an excellent woodlot composed of a variety of species. From the stand of radiata pine being thinned the farmer obtains annually an average of 200 posts, 3 strainers, 750 battens, and 8 cords of firewood. He treats the posts in his own creosote plant, and the growing and treating of the produce saves him over £190 per year. He is now making preparation to mill some of his trees for timber required on the farm. An area of from 4 to 6 acres of radiata pine has been estimated as sufficient to supply the above requirements.

The species which can be used for farm material are many, but it is necessary to choose those which are suitable for the site. If the choice falls on non-durable species such as pines or poplars, preservative treatment will be needed for any purpose requiring durability.

Suppression of Noxious Weeds

Many farmers look to trees to combat noxious weeds growing in places which are difficult to keep in order by ordinary farming operations. Such a method of attack on a menace which can be costly to eradicate is both effective and ultimately profitable.

It is of course necessary to choose species which will form a close canopy of branches and thus shut out direct sunlight from the ground. Species such as most pines, Douglas fir, and cypresses are suitable, but larch, poplars, and most other deciduous trees are quite ineffective. Until suppression is complete the fire hazard is very much increased by the intermixture of weeds and trees.

Programme of Operations

A farmer having decided what area or areas he wants planted in trees should plan his operations in the following order:—

1. Decide or get advice on the species to plant. The district Forest Ranger, the nearest Forest Service office, or an experienced nurseryman will help here if necessary.
2. Order planting stock or make preparation for raising his own stock.
3. If the land has scrub on it, prepare for planting by cutting and burning the scrub or at least by cutting lines through it.
4. Fence the area against stock and vermin (if present).
5. If he is raising his own stock, wrench (root prune) them one or two months before planting (see description in April 1956 "Journal").
6. Plant the stock (usually between May and August).
7. Cut back overhanging weed growth. This operation may have to be repeated if weed growth is vigorous.
8. Keep records of all operations, showing costs, dates (especially of plantings), kinds and origin of tree stocks, spacing of trees, and any other points of interest. Trees are a long-term crop and memories are often short, and such a record will be invaluable later.

Care of Livestock during July

Contributed by the Animal Research Division

PULPY KIDNEY IN LAMBS

WHERE pulpy kidney occurs in lambs under 6 weeks of age its incidence can be reduced by vaccinating the ewes before lambing. If ewes have never been vaccinated before, best results will be obtained from two doses of vaccine given at least a month apart. Ewes which were vaccinated last year will require only one vaccination. The last (or the only) vaccination should be given about a fortnight before lambing and this can be done quite safely if ewes are handled carefully. Very poor immunity results where the ewes are vaccinated much earlier. If most losses from pulpy kidney occur in lambs over 6 weeks of age, vaccination of ewes is of no value, but vaccination of lambs at marking with a second dose later may help.

BLOOD POISONING IN EWES AND LAMBS

Losses from blood poisoning in lambing ewes and marked lambs can be greatly reduced, if not eliminated, by vaccinating the ewes with blackleg vaccine about a fortnight before lambing. As the immunity which passes from the ewe to the lamb in the first milk does not persist for many weeks, lambs should be marked early. To obtain the best results it may be necessary to divide the ewes into early and late lambers, which should be vaccinated separately before lambing. Advice concerning vaccination can be obtained from any office of the Department of Agriculture. Where possible ewes should lamb in clean spelled paddocks, and lambs should always be marked in clean temporary yards. Sometimes losses from blood poisoning occur in lambing ewes that have not been vaccinated. If losses are occurring, it is too late to vaccinate. It may be possible to save some ewes by treating them with penicillin if the penicillin is used early enough. It is important that blood poisoning be confirmed, and the local veterinarian should be consulted in this matter. After such confirmation all ewes which are assisted in lambing should be treated by penicillin injection. This should be an emergency measure and should not replace vaccination, which is the cheapest and most certain means of treating blood poisoning.

SLEEPY SICKNESS IN EWES

Heavy losses from sleepy sickness sometimes occur in ewes carrying twins or heavy single lambs. These losses may be prevented by ensuring that ewes do not suffer a check just before lambing. If necessary, ewes should be divided into early and late lambers and drafted on to the best feed available 3 to 4 weeks before lambing. Research has shown that poor feed for 5 weeks before lambing can reduce the fleece weight by more than ½lb.

RINGWORM IN CALVES

Ringworm in calves is sometimes troublesome, especially in poorly nourished calves. Before any remedy is applied the scales should be removed by rubbing in a mixture of equal parts of soft soap and lard and scraping off the softened scabs the next day. The bare patches should then be dressed with an ointment consisting of 1 part of salicyclic acid and 8 parts of lard, or any registered stock remedy for ringworm which is available. As the infection can be transmitted to man, it is wise to wear rubber gloves when treating ringworm. In any case, the hands and arms should be thoroughly washed immediately after the dressings are applied.

ERGOTISM IN CATTLE

Hay made from ergotised grass will cause lameness and sometimes even loss of feet in cattle. The small black ergots which replace the seeds of ryegrass and other grasses can be easily seen, and if they are present in large numbers, the hay should not be used. Similar trouble often occurs when cattle are grazed on tall fescue grass even when no ergots are present. This grass should be regarded as poisonous and should not be grazed by cattle.

WINTER FEEDING OF COWS

It is imperative that cows should be well fed for 6 to 8 weeks after calving. They should have access to hay at all times, and if the pasture is poor, they should also receive up to 20lb. of silage per day. Early calving cows should be given about 2 hours' grazing per day on autumn-saved pasture and, in addition, should be fed as much silage as they will eat.

MILKING METHODS ARE IMPORTANT

At the start of a new season cows should be trained to let down their milk quickly and completely by the establishment of a fixed milking routine, so that the cows are brought into the shed, bailed up, washed, and milked in the same way at each milking. Anything which upsets the cows must be avoided. A brief but vigorous wash followed by the withdrawal of a squirt of milk from each quarter into a strip cup is the best method of stimulating the flow of milk. This will also help in detecting cases of mastitis early. As the duration of let-down is limited, cups should be put on immediately after the washing and starting process. A good milk flow indicator should be used and as soon as this shows that milk flow is slowed to ½lb. per minute the cups should be pulled down until milk flow again falls to this rate, when they should be removed at once. Massaging of the udder while the cups are pulled down should be practised only with cows which are known to need it.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during April and for the 9 months ended 30 April 1956, with comparative figures for the same month and 9 months of 1954-55, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
April 1956	7,310	210	7,520	—
April 1955	6,731	207	6,938	—
Increase or decrease ..	+579	+3	+582	+8.388
9 months ended 30/4/56	155,538	2,779	158,317	—
9 months ended 30/4/55	144,407	2,878	147,285	—
Increase or decrease ..	+11,131	—99	+11,032	+7.490

Butter in store at 30 April 1956 was 32,878 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage inc. or dec.
April 1956	5,630	881	6,511	—
April 1955	4,770	1,741	6,511	—
Increase or decrease ..	+860	—860	—	—
9 months ended 30/4/56	72,467	12,702	85,169	—
9 months ended 30/4/55	73,293	19,781	93,074	—
Increase or decrease ..	—826	—7,079	—7,905	—8.493

Cheese in store at 30 April 1956 was 24,761 tons

If these figures are converted into butterfat equivalent, there is an increase of 3.948 per cent. in butterfat graded for the 9 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

◆

Pasture Management and Storage of Seed Potatoes

Seasonal Notes by the Extension Division

WINTER pasture management should now receive close attention, particularly the planning of grazing of winter-saved feed. In the lower-rainfall arable districts the preparation of land for crops to be sown in spring and early summer should be considered in relation to soil conditions and prior and subsequent crops.

FEED OFF AUTUMN GRASS IF TOO LONG

IN districts where the autumn has been favourable it may be found that pastures closed for winter and spring feeding for the milking cows are now becoming too rank. Especially is this likely on the more fertile paddocks which were closed early. Pasture allowed to grow too long loses much of its palatability and digestibility. In extreme cases the bottom of the pasture becomes slimy and fungus infested, growth ceases, the clovers are suppressed, and there is a poor recovery after grazing. Pastures which have made too rapid growth should therefore be fed off now and closed once more for recovery during June and July. Where only a small portion of the farm has been closed for autumn-saved pasture or where poor recovery is expected the feeding should be light, the aim being merely to take the top off the pasture with a light concentration of stock. In this case it is not wise to break graze the paddocks unless they are very large. On farms where a large proportion of the available autumn pasture has been reserved the feeding may be made severe, the paddocks being break grazed in succession, starting with the more forward ones. On dairy farms where as much as two-thirds of the farm was closed the feed should be rationed to last the herd until mid-August. Sheep farmers will find that pasture that is becoming too long is best controlled by cattle where these are available.

—*B. A. GUNNING*

* * *

PUT EWES ON BETTER FEED

JUST as the dairy farmer now has a portion of the farm closed for autumn-saved pasture for utilisation shortly, so should the sheep farmer have several paddocks that have been closed for some time while the ewes were held on shorter rations. During this month a start should be made on this saved grass and rotational grazing practised up to and including the lambing period. Where the pasture is considered too long for good utilisation by sheep its height can be reduced by judicious stocking with cattle. These animals should be kept in one mob ahead of the ewes, and a 2- or 3-day interval can elapse to allow the pasture to freshen before ewes are put on it.

Where crops of swedes or chou moellier are available a start should be made this month to utilise them with the in-lamb ewes. By feeding in-lamb ewes better from now until lambing the incidence of pulpy kidney is greatly reduced, stronger lambs are born, and the ewes are in better condition to deliver their lambs.

CONSIDER TOPDRESSING

Many dairy farmers leave their autumn topdressing until the herds have been dried off and confined to one or two paddocks, but this practice cannot be recommended. Both phosphatic and potassic fertilisers give the best results when they are applied shortly before normal growing periods. In June growth is ceasing and fertilisers applied then cannot be expected to give the best results. Every endeavour should be made to apply fertilisers in March to increase growth into winter and it is usually better to delay topdressing until August than to apply phosphatic and potassic fertilisers in June and July.

—*G. A. BLAKE*

* * *

WINTER FALLOW

IN arable districts winter fallowing of old grassland is usually undertaken to prepare a seed-bed for a spring forage crop. The intention behind fallowing is not only to allow the breaking down of old turf into humus, but to allow a natural weathering of the soil exposed by ploughing and so reduce the amount of mechanical cultivation required later. In dry areas fallowing is favoured, as it is a means of retaining soil moisture, particularly when the crop may be sown in the drier months of October to January. The modern method of winter fallowing begins with one or two cuts of narrow "grass points" attached to a stiff-tined grubber in very late autumn or early winter, when grass growth is at its minimum. Alternatively, skim ploughing can replace grubbing. A few weeks after such pre-cultivation and before heavy frosts are experienced the land is ploughed and left in the furrow over winter. This procedure allows some breakdown of the turf before ploughing and assists rotting of the turf after ploughing. Pre-grubbing of the old sward also causes some mechanical penetration and results in less cultivation being required between ploughing and final cultivation. In some areas where it is not practicable or possible to pre-grub old browntop swards the use of the digger plough is advocated for winter fallowing. The action of the digger plough is similar to "double ploughing" in that the uppermost edge of the furrow is skimmed and the furrow is well fractured throughout by the quick-turn mouldboard of this type of plough.

—*J. D. WRAIGHT*

* * *

STORAGE OF SEED POTATOES

AFTER seed potatoes have been graded from the table potatoes it is essential that they be stored carefully until required for planting. The ideal method is to store the potatoes in a shed either in small bags or spread out, not too thickly, on a grating out of the direct rays of the sun. However, this is not always possible, and the general practice today is to store them in bags in a pit, usually on a dry, sheltered site where sorting can be done in late winter with some protection from cold or wet weather.

Whatever the method of storage is, several main points should always be kept in mind when seed potatoes are being stored.

1. Adequate ventilation is essential. Poor air circulation can cause overheating of the tubers, which may result in their collapse or a very poor strike when they are sown. Ventilation can be improved by stacking the bags on raised platforms in pits or on gratings in sheds, and by allowing more space between the bags themselves.

2. It is essential that the potatoes be well covered where there is a likelihood of severe frosts in winter, as frosts can play havoc with stored potatoes.

3. Care should be taken when handling potatoes to avoid undue damage to them, as, under storage, this can lead to high losses from dry rot.

4. Seed potatoes when wet should not be stacked in sacks, as this can often cause severe deterioration of the tubers.

5. It is a fairly common practice a month before planting to put the sacks of seed out along the headland of the paddock in which they are to be sown. Frequent turning of the bags will prevent excessive sprouting and will allow more even greening of the tubers.

—*W. A. R. MILLER*

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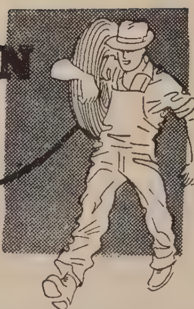

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Work in the Home Garden

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8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31

▲ Soil should be well worked and in especially good condition for July sowing. Sparrow photo.

SUNNY days in July, particularly if they follow a specially wet, cold June, usually encourage keen gardeners to plant and sow, but meteorological records taken over a number of years show that in most districts in New Zealand earth temperatures are lowest during June, July, and August and that hours of sunshine are fewest in June and July. Therefore, even if the weather is relatively sunny and warm in July, sowings and plantings in most districts should be small and confined to the hardiest subjects in situations where soil conditions are good. In this article A. G. Kennelly, Horticultural Instructor, Department of Agriculture, Dunedin, discusses work in the vegetable garden in July.

WEATHER and soil conditions in July are seldom as suitable as desired for outside work and as the gardening year has hardly begun, the home gardener should take the opportunity to attend to odd jobs for which there is not always time in the busier seasons. Soil and used seed boxes can be sterilised, tools sharpened and cleaned, bins, shelves, garden seats, trellises, and benches can be built or repaired, and where necessary cloches can be cleaned, repaired, and assembled for use. Paths and drains can be installed or improved; rock, brick, concrete, or even wooden edgings and steps can be built where there is a need or where they improve the amenities or appearance of the garden. Woody trash can be burnt and other garden trash composted.

Winter or early spring, when much ground is being dug over or is vacant, is a good time to apply lime. Rains that are usual before the land is in use again can be expected to help distribute it in depth.

Plans can be made for the forthcoming season's crops, special consideration being given to rotation, that is, ensuring that each crop is succeeded by a different one or one of another family. Plans should ensure, too, that as far as possible gluts are avoided and supplies appropriate to the capacity of the garden are available throughout the year. Only the best seed and varieties most suited to the district, soil, and season should be used.

Small sowings of such comparatively hardy subjects as broad beans, carrots, radish, silver beet or perpetual beet, peas, spinach, turnips, and spring onions can be made where climate and soil conditions are favourable. Lettuce and summer cabbage and cauliflower can be sown, though in less favoured districts a frame or especially favourable situation is advisable. If cloches are used, all the seed mentioned can be sown in well-drained soil, but preferably cloches should be in position about a week before sowing.

Hardy subjects such as horse radish, spring cabbage, garlic, and shallots, and in North Island districts onion seedlings, can be set out if the soil is in good order. Where the weather is not too severe lettuce and cauliflower can also be set out.

Rhubarb and asparagus beds should be cultivated. Where drainage is good and conditions are warm enough to enable the plants to respond, and the

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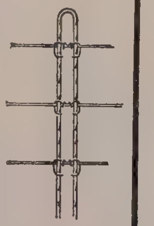

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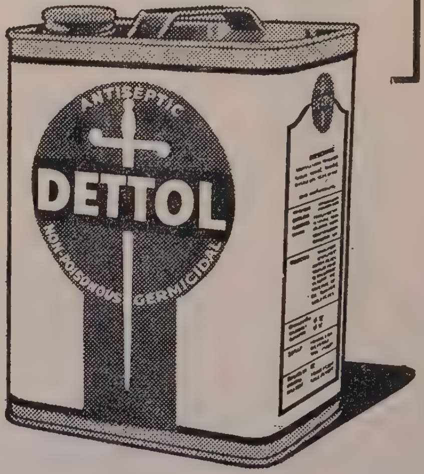

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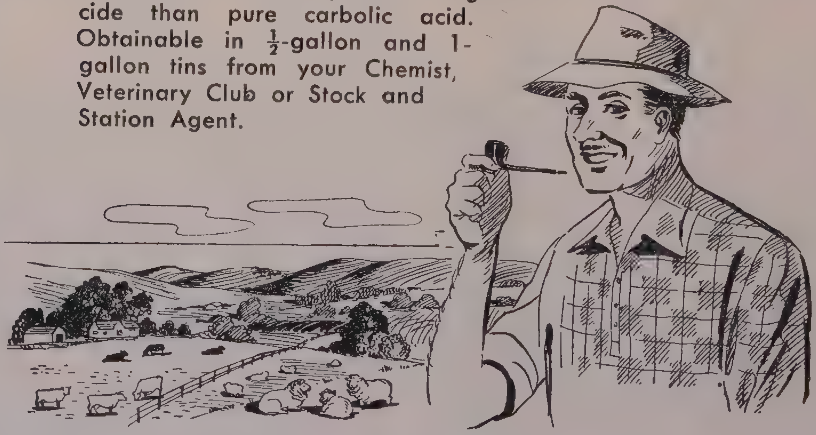

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[Green and Hahn

Broad beans can still be sown in July in single or double rows, preferably in a drill or shallow trench, though seed can be dibbled in where the soil is free working.

soil is in need of fertilisation, liquid manure can be applied. Where soil conditions permit the ground can be prepared for new beds of rhubarb and asparagus. It should be deeply dug and, unless the soil is in very good condition, organic manure, farmyard or stable manure, or blood and bone should be dug in. Deep digging is desirable on most heavy or fine-grained soils, as it improves drainage, which is important in successful production.

Tubers of Jerusalem artichokes can be sorted over and small tubers planted in districts where soil conditions are suitable. Potatoes in store can be sorted over and rotted ones eliminated. Seed tubers can be treated with DDT if the potato moth is likely to be troublesome, but such treatment of table potatoes is not recommended. In early districts some tubers can be set to sprout for planting later for a first crop.

Asparagus

Established beds of asparagus can be moulded up to cover them with a layer of soil to facilitate weed control and, where the soil between the rows has become excessively compacted, to assist drainage and aeration.

New beds are usually planted in August, but where the ground is reasonably dry it is possible to plant in July. Single rows should be about 48in. apart and the plants set about 18in. to 24in. apart in the rows. Popular varieties of asparagus include Mary Washington (strain 500), Martha Washington, Connover's Colossal, and Paradise. K.B.F., a newer variety, is claimed to be very high yielding.

Broad Beans

There are few hardier vegetables than broad beans and if they are sown in autumn or in favourable situations in winter, they mature when vegetables are usually scarce and lacking in variety. Very early sown beans do not always mature the earliest pods, as plants sown early in autumn are more liable to damage from disease or weather than plants sown just before or during winter.

Chocolate spot, which is readily recognised by the chocolate coloured blemishes on leaves, stems, and leaf stalks, is especially liable to be troublesome on plants that have made soft growth, which usually characterises broad beans sown in good conditions in the relatively mild weather of autumn.

Chocolate spot is best controlled by good rotation, the destruction of infected rubbish of previous crops, spacing which allows good aeration, and planting in well-drained soils. Spraying with thiram may be necessary in unfavourable weather or if the environment favours the disease.

Broad beans do well in fairly heavy, well-drained soil that has been well cultivated and contains adequate organic material. Heavy, sticky soils should be deeply dug and sowing should be deferred if the soil is wet. Though a small amount of potash is often beneficial, particularly where disease is troublesome, the single nutrient which has given most satisfactory results on most New Zealand soils is phosphoric acid. A dressing of 2oz. to 4oz. of superphosphate per square yard gives good results on many soils, though a small amount of nitrogenous fertiliser in addition to phosphoric acid may be advisable on well-worked home garden soils.

Seed is usually sown in double rows about 10in. apart with the seed placed diagonally 4in. to 6in. apart and 2in. deep in the bottom of a shallow trench or drill about 3in. deep.

Cauliflowers and Cabbages

In the poorer soils established crops of spring cabbages and cauliflowers should be encouraged to make strong, quick growth by side dressings of fertiliser or liquid manure. Spring or pointed-type cabbage and, where conditions are not too severe, cauliflower can be set out in July. This practice is favoured by some growers in districts where autumn and winter are severe and the land tends to lie cold and wet. If well-grown seedlings are planted out in a richly manured, well-drained soil, and temperatures are reasonably favourable, the plants mature very quickly.

Seed of cabbage and cauliflower can be sown now to provide heads for summer or, in the more favoured districts, late spring or early summer use. A sunny, sheltered situation where drainage and physical structure of the soil are good should be chosen. The seed-bed should be worked down to a fine tilth and a light dressing of a complete fertiliser is likely to give improved results on most well-worked garden soils.

Popular varieties of cabbage for sowing now include Greyhound, a small pointed type, and for rounded varieties Golden Acre and Green Acre. Popular varieties of cauliflower in-

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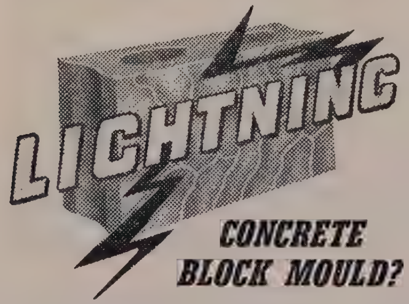

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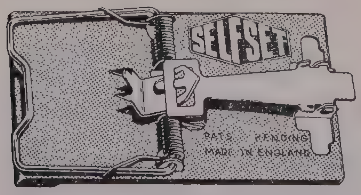

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Garlic

Garlic is very pungent and for those whose preferences lie in that direction it is excellent for using in sauces, pickles, and for flavouring various dishes. The colder the conditions are under which it is grown the more biting or burning is its flavour.

Garlic is usually grown from cloves (the divisions of the bulbous root) and set out when conditions are favourable in June, July, or August. It can also be grown from seed, which is usually sown in September or as soon as the ground has warmed enough for good growth.

The cloves are small bulbs which collectively make up most of the mature garlic bulb, but which break away readily from the main stem or bulb. There are 10 to 12 cloves in an average bulb produced in groups of 1 to 5. In a mature garlic plant at the end of the season all the leaves of the current season's growth and the stem and roots die, leaving the cloves to continue for the next season.

The cloves should be planted about 1in. to 2in. deep or a little less than the depth of the bulbs below the surface of the soil and 4in. to 6in. apart in rows 12in. apart. They can be pressed into the ground or planted in a drill. If whole bulbs are planted, they should merely be pressed half their depth into the soil. The soil must be well drained or the bulbs may rot. Cultivation apart from weed control is unnecessary on most soils.

Bulbs of the common variety have membranous, silvery white skins, though there are pink and red varieties. Culture is generally similar to that of shallots. Bulbs may mature in favourable conditions in from about 16 weeks from planting of the cloves. Early planted bulbs usually require about 20 to 24 weeks.

Onions

In northern districts, where it is customary to sow the main crop in autumn, onion plants can be set out 3in. to 4in. apart in rows 12in. apart if conditions are favourable. In most southern districts the main crop is sown in September, but in favourably situated gardens where soil conditions are good a small early sowing may be made toward the end of the month.

Potatoes

Potatoes should be mature before they are put in storage. They can be stored in bags, bins, or boxes, but air circulation should be good, and strong light should be excluded or they are likely to become green and unfit for eating. Where shed or cellar space is not available or is unsuitable, dry tubers can be stored in a pit or clamp which is either a hole or hollow in the ground in which potatoes are stored and covered with straw and earth, or a heap of potatoes covered first with straw and over which is a layer of earth to shed rain. An air vent, which is usually covered loosely with a sheet of tin or several planks placed to shed rain, is usually left at the top of the heap. Pits should not be dug where they may collect water, and even clamps on the ground surface should be sited so that they are well drained.

Though the practice has little application for most home gardeners, potatoes for long storage can be prevented from sprouting by dressing them with a sprout-inhibiting preparation. Various brands are available. In Department of Agriculture trials carried out some years ago tubers dusted at 5oz. to 8oz. per cwt. in June and July were still in good condition for culinary use by mid-October, but similar, untreated tubers had sprouted. Tubers intended for seed should not be treated.

Shallots

The shallot is a member of the onion family which deserves to be grown more widely by home gardeners because it is easy to grow, requires very little attention, has a milder flavour than most varieties of onion, and under any but the poorest conditions yields well.

In the simplicity of its culture, its vigour, yield, and freedom from disease the shallot compares favourably with the onion. Its only disadvantage is its smaller bulb. The name shallot dissociates it in the minds of many from other members of the onion family and often prejudices its use in place of the onion. However, apart from its characteristic habit of growth the shallot is readily confused by most people with smaller specimens of many varieties of onion, and the less common varieties of onion such as the multiplier or potato onion are occasionally grown under the misapprehension that they are shallots, some varieties of which multiplier onions closely resemble.

The shallot is a hardy perennial which as it grows sends up numerous fine, hollow, awl-shaped leaves 8in. to 15in. long. It seldom produces seed and is usually perpetuated by replanting bulbs or offsets, which are produced in clusters on the soil surface.

There are several selections or varieties of shallots and they differ in size and colour of bulb, but the commonest type has a bulb about the thickness of a walnut or a little thicker, pear shaped, about 2in. long, narrowed in the upper part into a fairly long point and enclosed in a tough skin which is russet-coloured and often coppery red toward the base. The skin is usually wrinkled lengthwise. Under the outer skin the bulb is greenish at the base, shading to grey or even purple at the top.

[*Sparrow*

Well-hardened lettuce seedlings can be set out in July if the soil is in good condition and heavy frosts or severe conditions are not expected. Cotton stretched along the row usually keeps off birds.

Among the larger kinds of shallots which have been much improved by selection are those known as the Russian shallot (also known as Large Brown or Large Red) and the Jersey shallot, the bulbs of which may grow up to 2in. in diameter and weigh several ounces. Named varieties of shallot are not generally available in New Zealand and obtaining the better varieties is usually a matter of luck or selection.

Soil and Manure

Shallots succeed in almost any garden soil, but prefer a well-drained, fertile soil rich in well-rotted organic matter. Heavy clay soils that dry out

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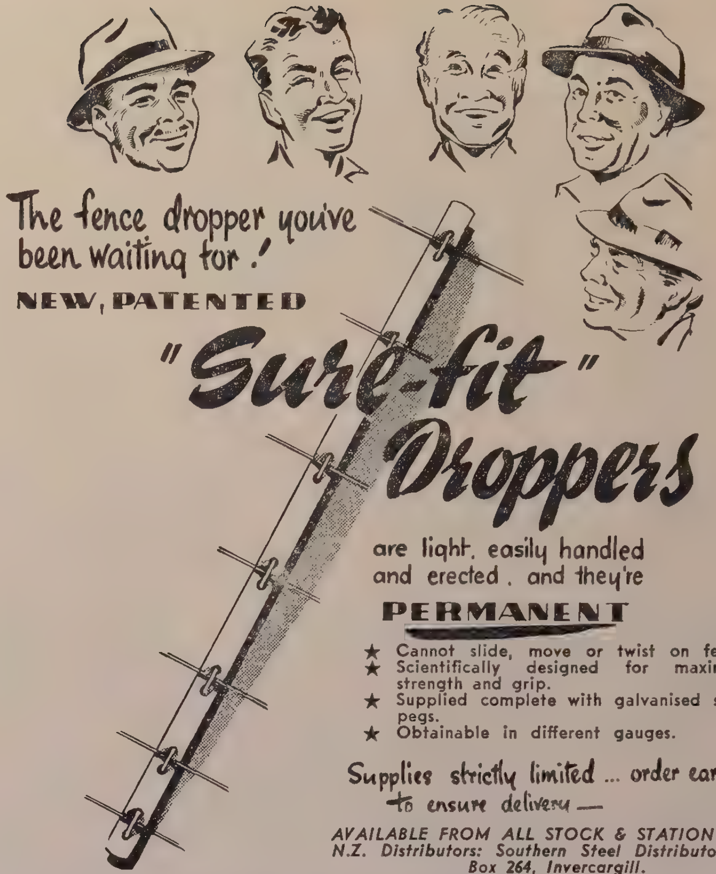

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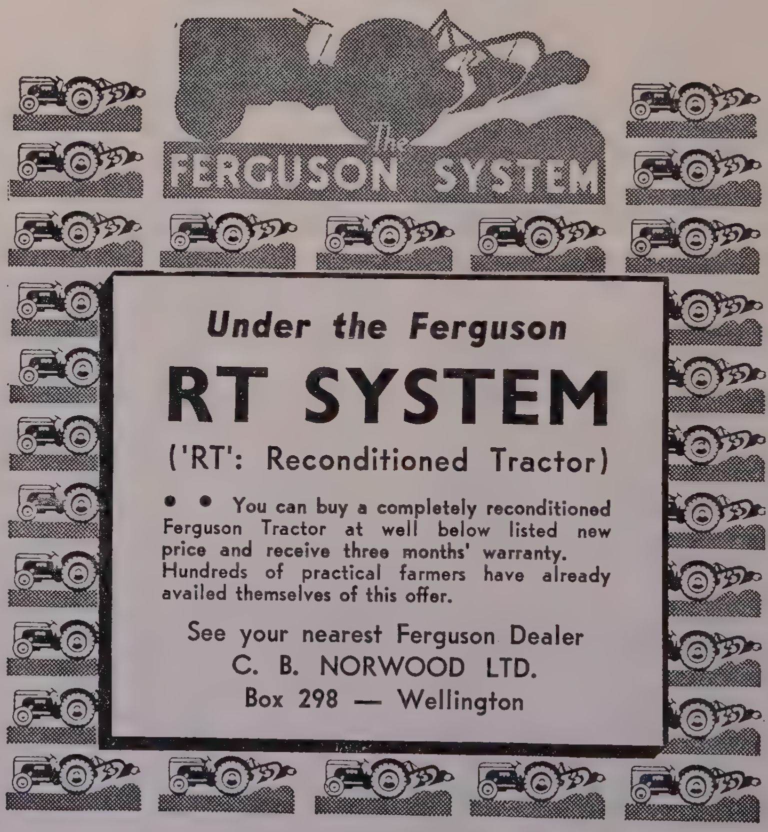

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[*Green and Hahn*

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excessively or are poorly drained are least likely to give good results.

Manurial requirements are moderate and they do well on soils that were heavily manured for a previous crop. Where additional fertiliser is needed a dressing made, for example, of equal parts of blood and bone and superphosphate applied at 2oz. to 4oz. to the square yard, according to the fertility of the soil, is likely to give good results. In districts of average to high rainfall growth in most soils not recently limed is likely to be improved by application of carbonate of lime at 3oz. to 4oz. to the square yard. Preferably lime should be well worked in some time before planting. To avoid the build-up of disease, crop rotation should be practised. Shallots should not follow other members of the onion family.

Planting

The home gardener is usually advised to plant shallots on the shortest day and harvest them on the longest, but they can be planted any time from late autumn until early spring when conditions are favourable. The keeping quality of different varieties varies. Some start growing much earlier than others and should be planted before they exhaust themselves producing leaves, though usually under good conditions even specimens that have become very wizened will produce a good crop.

Soil should be cultivated to a fine tilth, firmed, the rows marked or drills drawn, and the bulbs or cloves, graded to size, pressed far enough into the ground (usually ½in.) to stabilise them, though deeper planting, even up to the neck, is sometimes preferred. Bulbs should be set 5in. to 8in. apart, according to the vigour of the variety, in rows not less than 12in. apart. They soon develop roots and as they grow divide into a number of cloves or offsets which remain attached at the bases. There is little advantage in planting large bulbs unless a great number of small cloves are wanted. Medium to small, though not excessively small, bulbs do not generally yield as heavily as large bulbs, but they usually yield more large bulbs.

Shallots can be grown from seed sown in spring as onions are, but seed is not generally listed in local catalogues, though it is listed in some from overseas.

After establishment shallots should need no attention other than weeding and cultivation if the soil becomes compacted and aeration is restricted.

Lime in the Home Garden

Most home garden soils in New Zealand need to be limed periodically and though lime is not usually regarded as a fertiliser, it is a fertiliser in so far as it makes soils that are in need of it more fertile, and it is a rich source of the element calcium, which is important in plant nutrition.

Lime also influences the availability of plant nutrients in the soil. Physically, lime is important in the formation of tilth or soil structure, as it makes heavy soil less sticky by flocculating, or causing to adhere in flakes or crumbs, the fine matter of the clay it contains. This improvement in the crumb structure makes for better aeration and drainage and this makes the soil more open, friable, easier to work, and more favourable for plant growth. Lime does not flocculate and improve the physical condition of silt soils, but it improves most sandy soils by increasing the cohesion of the soil particles by its tendency to act like mortar, thus improving the soil's water-holding capacity.

Carbonate of lime rather than hydrated or burnt lime should be used on sandy soils and on soils containing very little organic matter, as too much lime containing free alkali may bring about a too rapid breaking

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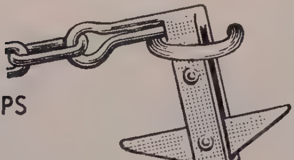
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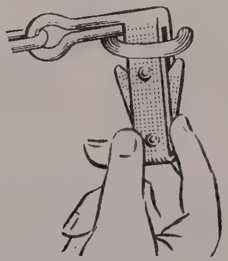
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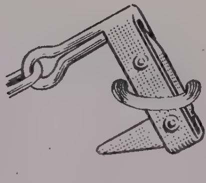
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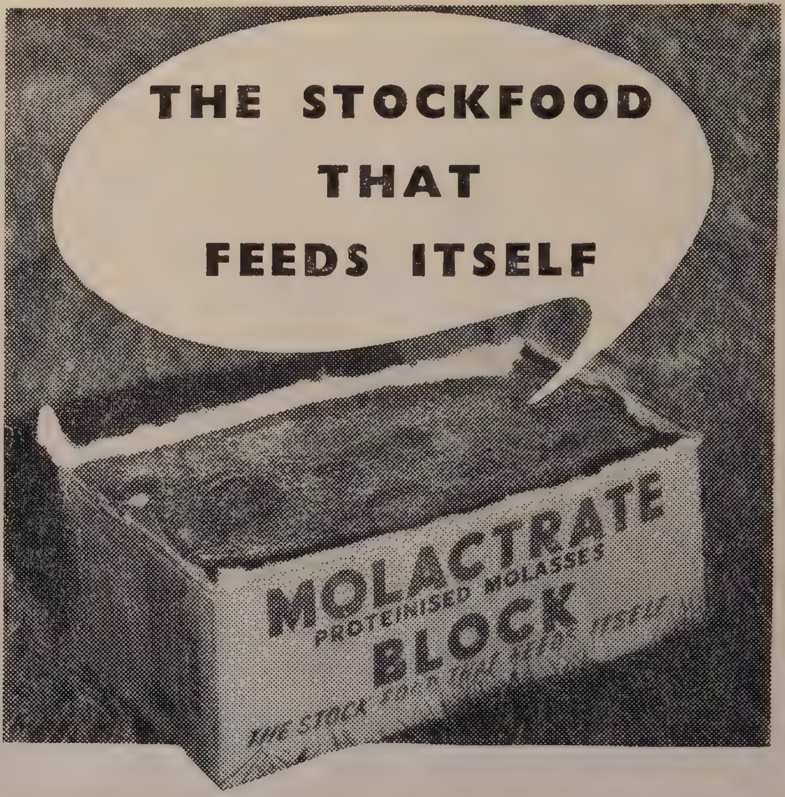

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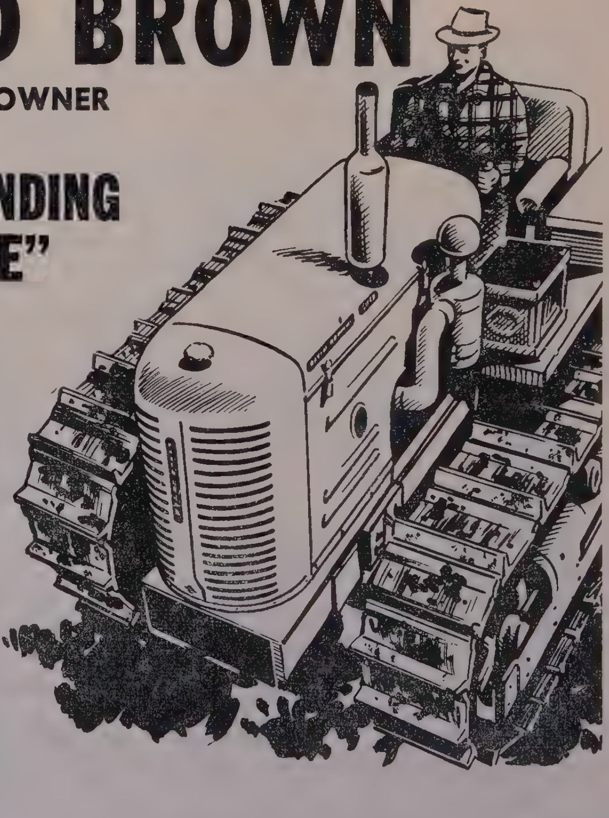
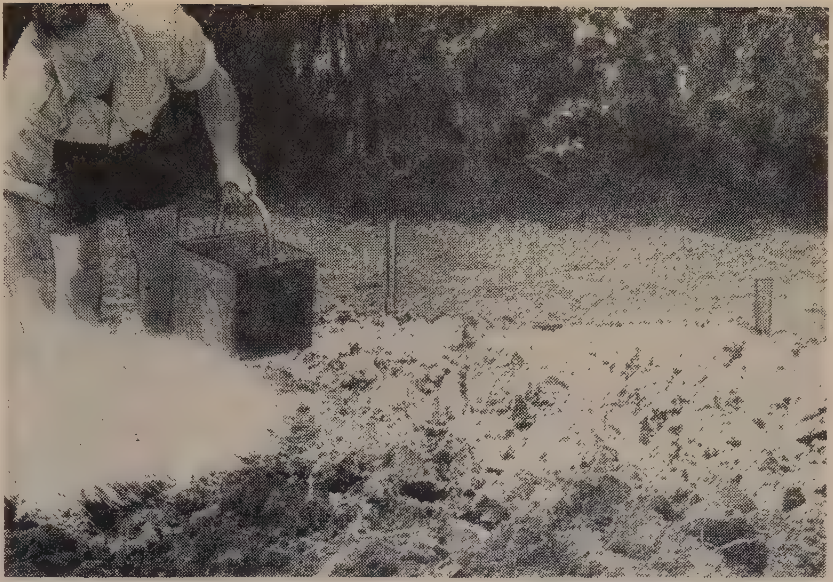


down and liberation of ammonia in the organic matter and as a result valuable nitrogen compounds are likely to be lost.

Lime is also beneficial because it reduces acidity and so influences the availability of some plant foods. Reduction of acidity also has a beneficial influence on organisms in the soil such as certain bacteria and fungi and soil animals such as worms, all of which play a part in breaking down plant and animal refuse and converting it into forms which can be assimilated by plants.



[*Sparrow*

Soil can be limed at any time of the year, but it can be most conveniently applied and worked in when the land is clear of crops.

Types of Lime

There are many types of lime, but the most important factor in any lime is its calcium content, though its immediate effectiveness also depends on fineness of grinding or particle size. The finer it is the more quickly it will be available and the more intimate can its contact be with soil particles. Hardness of the stone also has a bearing on the availability of ground limestone.

Lime should always be applied as evenly as possible, as there is little sideways spread except by mechanical means, though its downward spread is assured by rain. The colour of lime does not necessarily indicate its purity. Good lime may be white, off-white, yellowish, or brown.

The three types of lime principally of interest to the home gardener are:—

1. **Carbonate of lime**, the natural form of limestone, chalk, or ground shells. It is also called calcium carbonate or unburnt or mild lime.

2. **Hydrated lime**, which is also called calcium hydroxide or slaked lime or hydroxide of lime. This is obtained by treating burnt lime or quick lime with water, which it absorbs readily, heating in the process, and, unless too much water is applied, finally breaking down into a fine powder.

3. **Burnt lime** (calcium oxide or oxide of lime) is also known as caustic or unslaked or builders' lime. It consists chiefly of lime in the form of calcium oxide. It is produced by heating lumps of quarried limestone in a special kiln.

Carbonate of lime is the most useful form of lime for the home gardener. It is often referred to as garden lime, as it stores well and in moderate amounts does not cause plant injury. Hydrated lime and burnt lime are more soluble than carbonate of lime, and hydrated lime can be used in making bordeaux mixture sprays. Solubility is not necessarily an advantage, as soluble lime is readily washed from the soil. The less soluble forms of lime remain available to plants longer.

On a comparative basis about 2lb. of carbonate of lime is required to equal 1½lb. of hydrated lime or 1lb. of burnt lime.

Need for Lime

The response of vegetable crops to soil acidity or alkalinity is influenced by such factors as moisture, drainage, soil texture, and organic matter, but most crops prefer a neutral or slightly acid soil, though most will grow satisfactorily in slightly alkaline conditions. Some crops, such as potatoes and water melons, tolerate considerable acidity, but legumes generally prefer a soil that has been limed or is neutral, though blue lupins, which are often grown in the home garden as a green crop, are an exception. Barley, which is also often used in the home garden as a green crop, is likely to fail on acid soils, and as it is quick growing it is occasionally used as an indicator plant. The degree of acidity and alkalinity of the soil is indicated by pH figures, and the pH table of values is as follows (each decrease of one unit in pH value represents a 10-fold decrease in acidity):—

pH	
4.5 and lower	Very strongly acid
4.5 to 5.2	Strongly acid
5.3 to 6.4	Medium acid
6.5 to 6.9	Slightly acid
7.0	Neutral
7.1 to 7.5	Slightly alkaline
7.6 to 8.2	Medium alkaline
8.3 to 9.0	Strongly alkaline

The determination of the optimum amount of lime needed by any particular soil is a matter for the expert. Soils are so variable that though the amount of lime likely to be required by a soil can be determined fairly accurately in the laboratory, the most accurate picture of the requirement of any particular soil is likely to be obtained only by checking laboratory results against field trials with similar soil and where rainfall, management, and crop are considered.

It is not possible to make strictly accurate over-all recommendations for applying lime to all home garden soils, as soil type and management, crops grown, and rainfall must all be considered. These factors vary greatly throughout New Zealand, but generally the application of comparatively small dressings of lime (2oz. to 4oz. of carbonate of lime a square yard, for example) annually is likely to be more satisfactory (particularly on the lighter soils) than heavy dressings at intervals of, say, 3 or 4 years. However, on some soils that are heavily buffered (that is, resistant to change in acidity) heavy initial dressings of lime (up to 2lb. a square yard) may be advisable.

Other factors being equal loss of lime in the soil is proportionate to rainfall. The higher the rainfall is the greater the loss will be. Lime can be applied at any time of the year, but late autumn, winter, or early spring is often preferred, because so much ground is usually vacant or being dug then.

The possibility of overliming a soil should not be overlooked. In some types of soil an excess may interfere with the availability of some of the minor, though essential, plant-food elements. Deficiencies of elements such as boron, manganese, and iron are sometimes caused by an excess of lime.

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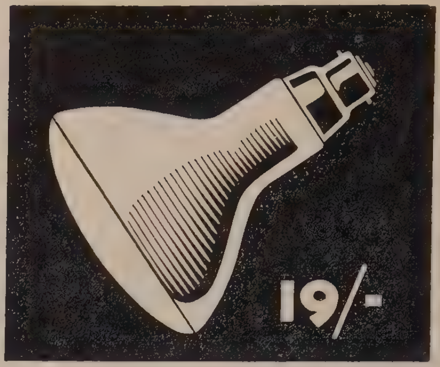

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Land Improvement in Awarua Valley, Northland

THE establishment of highly productive pastures on Awarua clay loam (once a problem soil) has now been made possible and economic through the use of molybdenum. This article by N. A. Clarke, formerly Instructor in Agriculture, Department of Agriculture, Kaikohe, describes the work of Mr. A. W. Dewson in the initial development of a 712-acre property 10 miles south of Kaikohe, where derelict marginal land is being converted to a productive dairy farm.

A general view of the property showing contours and the internal *Hakea saligna* hedges.

THE Awarua Valley is in the centre of the widest part of the Northland Peninsula and is the most eastern valley of an area which is composed of a group of soils of similar origin. Low ranges of hills running in a north-west to south-east direction, dissect the area into a number of valleys.

The height varies from 400ft. to 500ft. above sea level in the valley floors to 1300ft. at the peaks. The annual rainfall varies from 65in. in the eastern valleys to 90in. to 100in. in the western valleys. Owing to the series of ranges and valleys this area is comparatively well sheltered from the prevailing westerly wind.

Frosts are very light and few.

Soils

The soils on the farm are two closely related soils, namely, Awarua clay loam and Waimatenui clay loam. Both are of volcanic origin, being derived from andesitic rock which is common in this part of Northland and which is bounded by Tautoro and Waipoua Forest to the north and Kaihu and Parakao to the south. Volcanic eruptions with their consequent lava flow have formed these series of rolling to steep hills. Later eruptions have produced steep outcrops of doleritic rock which have pushed their way through the andesitic layers to form the rocky and steeper peaks of the area. Awarua clay loam is the most mature soil of the group in this area and naturally it is the most weathered and leached. It was this soil type which up to the time of the discovery of its molybdenum deficiency about 2 years ago had defied attempts at economic development to productive pasture and was considered to be a problem soil.

Some of the herd grazing autumn-saved pasture. An electric fence is being used.

Early History

Originally the land was covered in bush and scrub and some areas of the scrub land were converted into danthonia pastures and used mainly for seed production, the common practice being to carry no livestock

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and burn the area each year after the seed was stripped.

In 1933 three companies interested in tung oil production bought 3000 acres at Awarua and began developing these properties for tung oil plantations. The trees were planted in 1933 and 1934 as also were the shelter belts. In 1936 *Hakea saligna* shelter belts were planted as internal shelter. They were set 5 chains apart on the sheltered slopes and 2½ chains apart on the unsheltered slopes.

The tung oil tree is a native of China and produces a fruit very much like a lemon. The oil crushed from the fruit is used for various purposes, the main ones being as an ingredient of high-grade varnish, in the manufacture of linoleum, in the cosmetic industry, and of late in the manufacture of aircraft fabric.

By 1936 and 1937 it was obvious that the tung oil tree was not going to do well in this area. Reasons advanced for the unthriftiness of the trees were the unsuitable climate and the condition of the soil. A little crushing of the fruit was done in 1938 and 1939, but by 1940 it was apparent that the venture was not a success.

In 1940 the three companies merged and the 3000 acres were managed as a grazing property.

Early in the war about 1200 to 1400 acres were grassed, but as in the past, and as was common to other properties in the area, the pasture quickly reverted to a dominant and tight danthonia-browntop sward with no vestige of clover.

In July 1953 Mr. A. W. Dewson and his sons bought 1000 acres which originally were part of the 3000-acre tung oil plantation. The pastures were dominantly danthonia except for 30 acres which had been put into new grass by a previous owner. The 1000-acre property at this stage was carrying 200 sheep and 40 cattle and the stock were sometimes wintered off the area. Mr. Dewson sold 288 acres shortly afterward, which left a property of 712 acres. Departmental trials on this and other properties backed by farmers' trials had shown that 2½oz. of sodium molybdate per acre applied alone to the danthonia sward produced a heavy growth of volunteer clovers and *Lotus* species from an apparently cloverless sward. On one trial on Mr. Dewson's property 2½oz. of molybdenum produced in 6 months a sward of *Lotus uliginosus* (*major*) a foot high. On similar soils of higher fertility white clover became the dominant pasture plant. Here likewise stock carrying capacity was estimated to be increased threefold after the first molybdenum dressing.

Pasture Establishment

Spectacular results from trials with molybdenum had just been secured

LAND IMPROVEMENT IN AWARUA VALLEY

▲ A paddock on the old tung oil plantation which has reverted to pasture, showing some of the original tung oil trees.

▼ A similar paddock to that illustrated above, showing autumn-saved pasture 18 months after the beginning of the development programme. The tung oil trees were removed some years before the photograph was taken.

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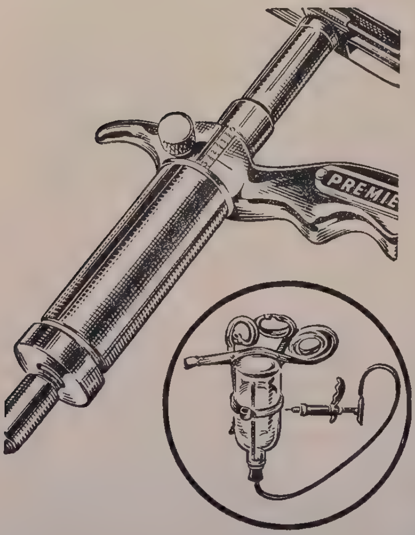

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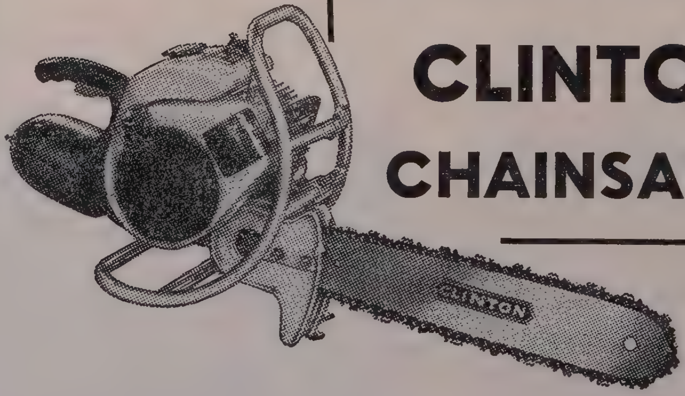

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when Mr. Dewson took over the property and started development work.

In 1953, 78 acres were topdressed with molybdenum serpentine superphosphate. In the autumn of 1954, 150 acres were lightly disced, harrowed, and oversown with the following mixture per acre:—

	lb.
Short-rotation ryegrass ..	5
Perennial ryegrass	10
White clover	2
Red clover	2
Subterranean clover	2
Total	21

In addition ½ ton of lime and 3cwt. of molybdenum superphosphate per acre were applied at sowing down.

There was an excellent strike, which can be gauged by the accompanying photographs. Fifty heifers were milked that season on the 150 acres of oversown pasture. Butterfat production was 6500lb. and 2500 bales of hay were harvested. The hay was notable for its quality and consisted of leafy *Lotus uliginosus* (*major*), red and white clover, paspalum, and cocksfoot with some short-rotation and perennial ryegrass.

In the autumn of 1955 another 100 acres were oversown and 15 acres of this area were old pasture which had reverted to small manuka and fern. In addition the areas previously brought in received a second dressing of molybdenum serpentine superphosphate. Thus 5oz. of molybdenum per acre had been applied to 150 acres of pasture within 12 months. However, analysis of soil and pasture showed high copper levels and low molybdenum levels. It was considered therefore that trouble would not result through an excess of molybdenum inducing a copper deficiency in the stock.

▲ A typical original pasture which has reverted to sodbound danthonia, browntop, and paspalum.

▼ The same pasture 18 months later after it has been oversown and has received two dressings of 3cwt. of molybdenum serpentine superphosphate and ½ ton of lime per acre. It has been closed for autumn-saved pasture.

The cultivation of the area brought in in 1955 consisted of two light cuts with discs to chop up the stunted and blighted manuka and scattered clumps of fern. This was followed by a heavy bush and bog harrowing and after the seed was sown another harrowing was carried out to cover the seed. The seed mixture used was 7lb. to 8lb. of perennial ryegrass, 1½lb. of red, white, and subterranean clovers, and 1lb. of crested dogstail per acre. Also the herd was increased to 80 cows and in addition 30 yearlings and 40 pigs were wintered on the property.

The 20-year-old *Hakea saligna* hedges which had been planted every 2½ or 5 chains presented a major problem in development. The farm was divided up into about 2½-acre paddocks with the hedges covering an area of 20ft. to 30ft.

Mr. Dewson overcame this problem by cutting out and burning two of every three of the internal hedges. Thus reasonably sized paddocks were obtained which are very well sheltered by the remaining *Hakea* hedges and the pine plantations.

Farm Management

Good stock and pasture management has been the prime object so that the herd replacements should have adequate feed at all times of the year. Mr. Dewson closes all the improved pastures on the farm for autumn-saved pasture except those necessary for wintering the yearlings.

The herd is wintered on the danthonia area and given adequate

AWARUA VALLEY . . .

hay. However, Mr. Dewson has found that the cows do not do well on the danthonia no matter how much hay they receive, so in future years a crop of swedes will be grown for this purpose.

A crop of soft turnips will follow the swedes to maintain summer production and then the area will be sown to new pasture in autumn. Thus cropping will not only solve the winter feed problem as well as boosting summer production, but will help to prepare the ground for new pasture as follows.

The cultivation necessary for two crops will eliminate the fern and manuka, and as the crops will be fed off in situ, this will provide the consolidation so necessary on this volcanic soil for successful pasture establishment.

Other recognised farm management practices such as rotational grazing, the extensive use of the electric fence, and harrowing of grazed pastures are also in operation and are playing an important part in maintaining productive pasture.

Potential Production

The promising results so far obtained will be improved markedly through the provision of winter and summer forage crops which, when sown to new pasture, should provide even higher-producing pastures than are now attained through oversowing.

The most economic topdressing programme is considered to be two consecutive dressings of molybdenum serpentine superphosphate, followed by molybdenum serpentine superphosphate every third year interspersed with serpentine superphosphate in the 2 intervening years. A refinement is dressings of serpentine superphosphate and basic slag respectively in the intervening years. Half a ton of lime every second year is recommended, and potash at ½cwt. per acre will probably be necessary once the pastures have had two or three dressings of phosphate. Heavier dressings of potash will be necessary, however, when the pastures are harvested for hay and silage.

A potential of ¾ milking cow per acre plus replacements producing 250lb. of butterfat per acre is a goal which should be attained in the not so distant future. The area's potential for fat lamb and beef producing is also bright.

Though Mr. Dewson and his sons would be the first to admit that much remains to be done, it is apparent that the battle with another of New Zealand's problem soils is being won. The factors responsible are the application of soil research allied to proven and sound methods of farm management, supported by finance, and carried out by men with initiative and the will to work.

☆

Conservation of Wildlife

"IN recent years there has been a lively interest among sportsmen and particularly among sportsmen farmers regarding what can be done to retain or if possible to increase stocks of game birds in New Zealand. Much interest has been shown in planting special food plants for game birds and in ways of improving existing habitats. In addition there is ever with the sportsman the fear that predators are busy killing out what he would like to preserve," states the Secretary for Internal Affairs, Mr. A. G. Harper.

"It is evident also that there is an increased interest among farmers in either the making of artificial duck-waters or the salvaging and improving of remnant pieces of swamp unsuitable for farm purposes. In America this field of work as a branch of wildlife management has been greatly developed and is indeed a very new field for applied biology.

"Recently we have received in the library of the Wildlife Division of the Department of Internal Affairs a copy of 'Our Wildlife Legacy', by Durward L. Allen, and published by Funk and Wagnalls, New York (422 pp., 5 dollars). The Division's Research Biologists feel that this is a really outstanding book which can go a great way to serve the purposes enumerated above and which can be read with great advantage by sportsmen, sportsmen farmers, and any citizen interested in wildlife matters."

A short review of "Our Wildlife Legacy" prepared by Dr. R. W. Balham of the Wildlife Division follows.

"There has been a great need in recent years for a book on wildlife science which would suit the layman and the technician and provide supplementary reading for lectures in elementary courses in wildlife conservation. Allen's new treatise fills that need admirably, and is certainly the most lucid, best written, and most up-to-date account produced in the last 20 years. He presents a wide range of relevant facts on terrestial and aquatic wildlife in such a manner that responsible citizens can do their own thinking.

"Many principles are discussed, including the relation of nutrition to vigour and reproduction; population mortality in short-lived species; carrying capacity and limiting factors; habitat improvement; population fluctuations.

"This book is divided into three parts, the first, 'Numbers at Work', concerning population dynamics, the second, 'Paths and By-Paths', dealing with management and mismanagement, and the third, 'The Method and the Outlook', showing the path toward intelligent management based on research."

The National Library Service now has one copy of the book and expects soon to have several copies more available for distribution through the Country Library Service.

Meteorological Records for April

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	66.5	+ 5.4	79.8	52.0	17.77	24	+ 12.17	4.80	7	78
Auckland	160	66.6	+ 5.3	76.6	55.8	14.14	20	+ 9.75	4.20	7	96
Tauranga	10	64.0	+ 5.5	74.3	50.1	7.03	22	+ 2.01	1.63	8	80
Ruakura	131	64.0	+ 7.4	75.6	43.9	10.03	23	+ 6.29	1.62	18	83
Rotorua	975	61.9	+ 6.5	73.4	47.5	9.11	21	+ 4.48	1.75	19	54
Gisborne	12	64.4	+ 6.5	77.3	42.9	3.78	16	+ 0.12	1.32	4	107
New Plymouth ..	160	62.8	+ 4.7	75.5	50.0	10.95	22	+ 6.17	2.16	20	123
Karioi	2125	56.4	+ 6.0	85.0	40.6	3.82	22	+ 0.0	0.95	18	
Napier	5	65.1	+ 6.6	80.8	49.5	1.32	10	— 1.31	0.41	4	115
Wanganui	72	64.0	+ 6.5	77.9	48.6	6.07	21	+ 3.27	1.68	20	125
Palmerston North ..	110	63.2	+ 6.6	75.7	46.4	4.79	21	+ 1.43	1.22	20	94
Waingawa	340	60.6	+ 6.1	78.0	40.0	2.37	12	— 0.53	0.80	20	108
Wellington	415	61.6	+ 5.5	73.0	48.2	4.88	16	+ 1.07	1.66	8	128
Nelson airfield ..	5	59.2	+ 5.1	72.0	36.2	6.40	15	+ 3.45	1.52	8	156
Blenheim	12	60.6	+ 5.1	77.2	37.8	4.83	12	+ 2.79	1.87	8	153
Hokitika	15	58.9	+ 6.0	75.0	37.6	15.59	25	+ 6.76	3.72	23	94
Hanmer	1270	56.9	+ 5.4	75.0	32.0	2.78	15	— 0.56	1.48	8	149
Christchurch ..	22	58.6	+ 5.1	79.4	38.2	1.23	11	— 0.62	0.84	8	98
Ashburton	323	57.8	+ 5.2	78.6	30.2	2.22	10	— 0.19	1.43	8	105
Timaru	56	57.0	+ 4.0	77.0	35.3	2.14	17	+ 0.48	0.67	8	96
Alexandra	520	56.6	+ 5.5	80.3	32.1	1.41	12	+ 0.06	0.44	9	124
Taieri	80	55.4	+ 4.1	81.1	29.3	1.95	8	— 0.15	0.88	10	108
Invercargill airfield ..	0	54.2	+ 4.3	70.3	33.4	1.84	11	— 1.88	0.54	28	94
Chatham Islands ..	140	57.2	+ 4.1	65.0	45.3	3.28	18	+ 0.71	0.95	10	

Pruning and Training Shy-bearing Grapevines

PRUNING and training methods are known to influence the vigour and cropping of grapevines. In this article F. Berry-Smith, Viticulturist, Department of Agriculture, Auckland, explains some modifications to improve the performance of shy-bearing vines.

MOST high-quality wine grapes and a number of good table varieties are inclined to be poor bearers. Because of this failing many varieties of desirable quality are not grown to any extent.

At one time such high-quality wine grapes as Cabernet Sauvignon, Shiraz, Pinot Meunier, Pinot Chardonnay, Pinot Gris, and Riesling were grown fairly extensively, but they have been gradually replaced by heavier-bearing varieties of lower quality.

For similar reasons high-quality table varieties such as Black Hamburgh, Alphonse Lavallee, and Golden Chasselas have been superseded by more reliable bearers like Albany Surprise. Though susceptibility to disease has also been an unfavourable feature of many high-quality varieties, their inability to set consistently good crops has been their main fault.

Most shy-bearing varieties are comparatively weak growers. Any system of training which encourages the formation of larger vines will increase vigour and cropping.

Weakening Effect of Severe Pruning

Weak-growing vines are commonly pruned too severely, which in itself has a weakening effect, leading to serious debilitation. When vines are young it is important to limit the crop, as overcropping at this stage weakens their constitution in after years. Faulty nutrition and exposure to disease and insect damage may also cause stunting, with long-term detrimental effects. No amount of attention to pruning and training can produce results if it is not supported by good all-round vineyard husbandry.

The mistake of excessive pruning becomes apparent when it is realised that root formation is directly related to foliage development. By restricting foliage development severe pruning thus inhibits root extension, just as though the roots themselves were pruned. To obtain vigorous, productive vines pruning and training methods which promote the necessary development must be adopted.

A system of pruning incorporating the principles outlined is shown below. Applied to the Pinot varieties in the Henderson district, this system has more than doubled many crops.

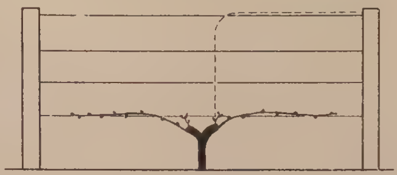
Vines may be converted to this new inverted cordon system of training in three seasons without loss of production.

The steps in conversion are shown at right. First, at pruning, a strong cane arising near the trunk from a spur or watershoot is selected. This is laid down on the top wire of the trellis and only one bearing rod is left on the old system on the bottom wire. Growth from buds lower than the one immediately below the top wire is removed as superfluous on the newly trained cane. The bud just below the top wire later forms the other arm.

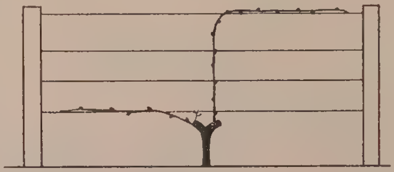
[*Sparrow*

Vine converted to inverted cordon system in a commercial vineyard.

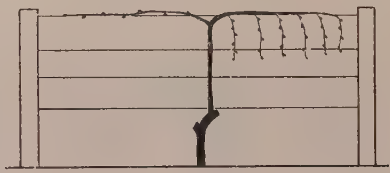
Conversion from Double Guyot to Inverted Cordon System



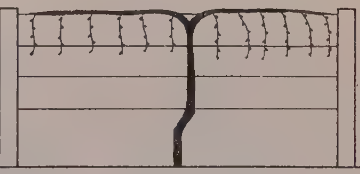
Vine pruned on double Guyot system. The dotted line indicates growth selected at next pruning to form new arm on top wire.



Pruning first year.



Pruning second year.



Pruning third year. Conversion completed.

At the second pruning growth from the cane on the top wire is laid to form the other arm and a number of short inverted fruiting rods. At the same time all wood on the old system on the bottom wire is removed.

At the third pruning the short inverted fruit-bearing rods are carried the full length of the new permanent arms, completing the new framework. Routine pruning then consists of renewing the short bearers each year from a basal shoot. Inversion of the bearers causes the basal shoots to break strongly, allowing their renewal close to the main arms without the necessity of providing a 2-bud spur to each bearer for this purpose, as is done with other systems of long pruning.

If bending the bearers down for tying is difficult, the work can be

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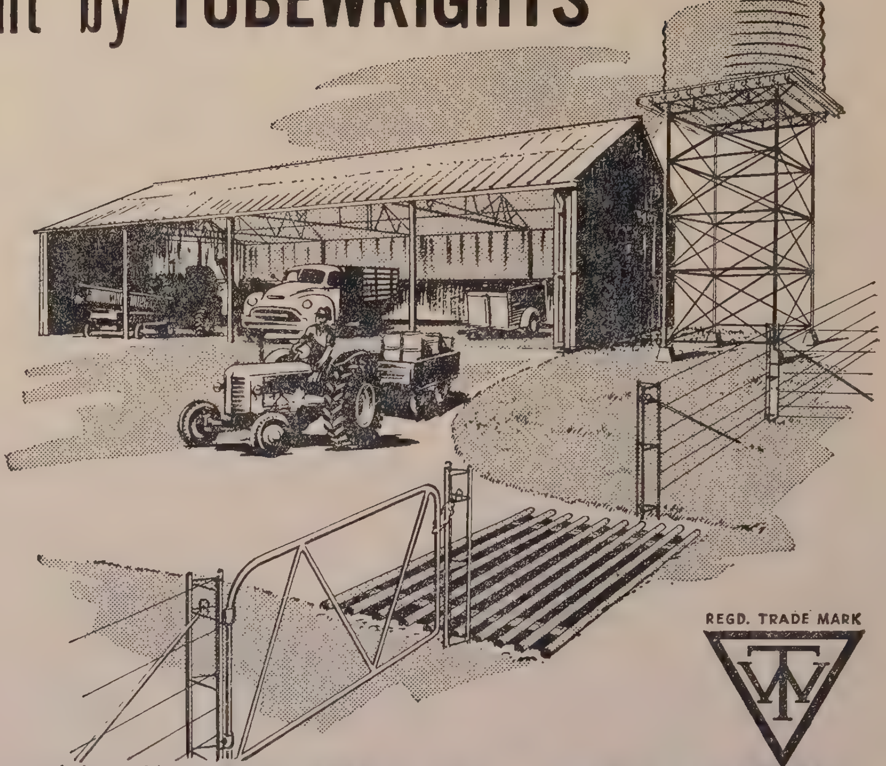

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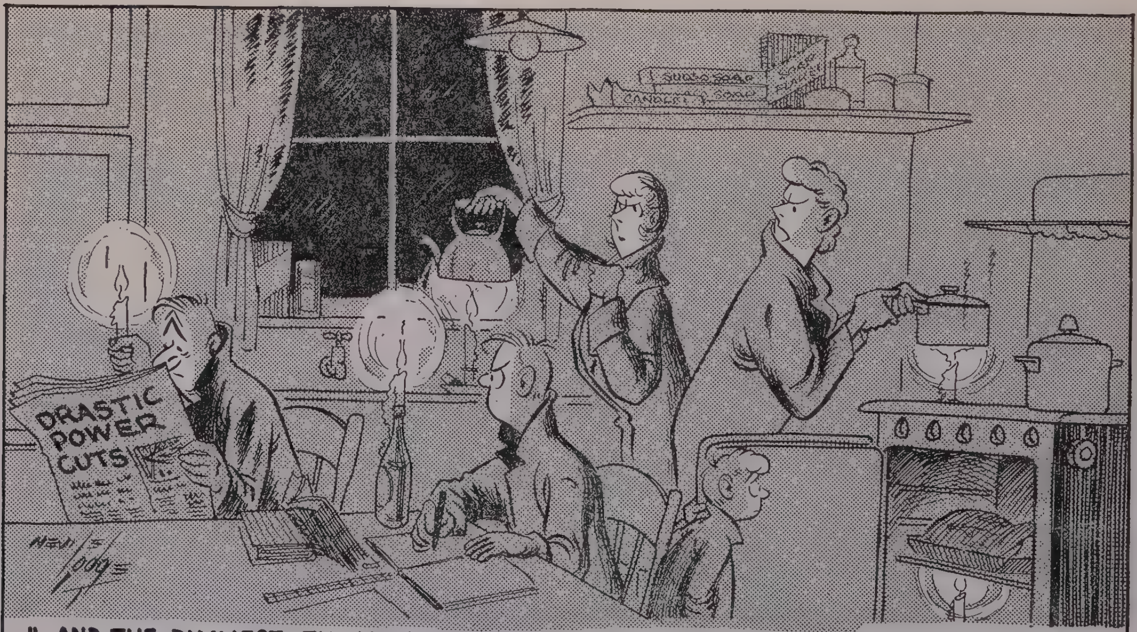


"—AND THE DIMMEST THING HERE IS THE PERSON WHO SAID TO LEAVE ORDERING BLUE PENNANT KEROSINE UNTIL LATER, WHEN WE MIGHT NEED IT!" P3-6

Should you like a copy of this cartoon write to: Advertising Division/36, the Shell Company, Box 2091, Wellington.

eased by bending them progressively at each internode with both hands, a start being made at the base.

Pergola Systems

The principle of extension to promote vitality may be taken a stage further to the pergola systems of trellising.

The complete overhead pergola with which a post is used to each vine and cover of cross wires is fairly well known. The veranda type trellis, which gives the same results at lower cost, is not so well known and its description follows.

The scheme is illustrated at right. The vines are usually spaced 8ft. to 10ft. apart with a corresponding distance between the rows. Only one vine in every three is supported by a post.

In establishment the unsupported vines are staked until self-supporting. Alternatively the vines may be led up to the top of the trellis on strong twine stretched taut between the centre wire and a peg close to the vines. If the twine is treated with a preservative compound, it will last for a few years.

The whole structure must be very secure, as wind pressure will collapse anything flimsy and insecure in the ground.

Training the vines on this type of pergola is somewhat similar to that previously explained for the inverted cordon method. When the vine reaches the top of the trellis all lower shoots are kept disbudded.

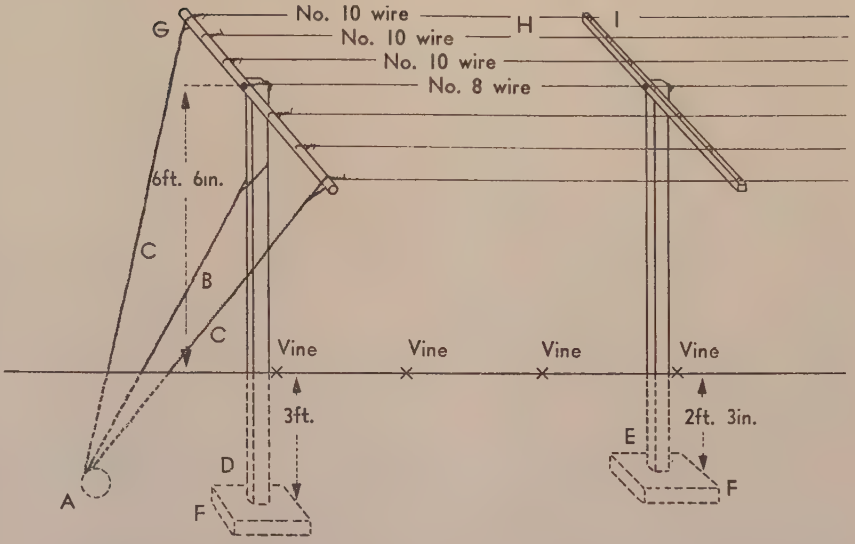
The sequence of pruning operations to establish vines on this system is shown at right. The permanent framework of the vine forms a T shape. Proceeding from the arms are the annually replaceable spurs of 2 buds and short bearers of about 6 buds. The spurs provide the replacement wood each year. The shoot proceeding from the lower bud of each spur is shortened back to 2 buds to form a new spur. The shoot from the upper bud of each spur is pruned to about 6 buds to form a new fruit bearer and the old bearer is entirely removed.

This arrangement prevents undue extension of the permanent framework. Without spurs it is difficult to replace the fruit bearers close to the main arm, as the basal shoots on the fruit bearers are generally too weak.

It is important to train the vine trunks as straight and perpendicular as possible, as they then afford better support and relieve the weight on the trellis.

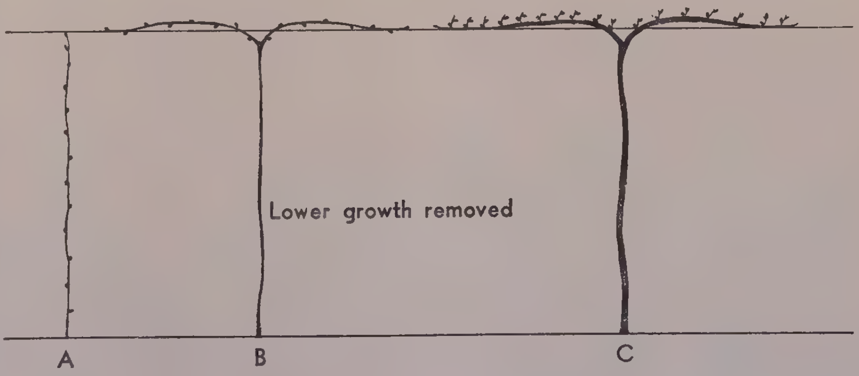
Pergola systems are particularly well suited to table grapes, as the bunches hang freely beneath the trellis. This permits drying out of moisture and accessibility to sprays

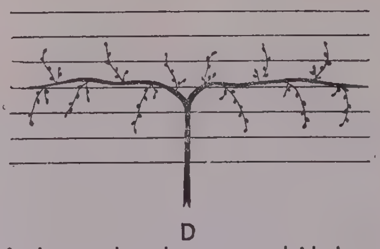
Structural Details of Veranda Pergola



A—Stay block set 2ft. to 3ft. in soil.
B—Main stay of 4 strands of No. 8 galvanised wire twisted tight.
C—Beam stays of 2 strands of No. 8 galvanised wire.
D—End post of 4in. x 4in. treated timber or heavily reinforced concrete.
E—Intermediate posts of 4in. x 4in. treated timber or reinforced concrete.
F—Flat stone or 12in. square concrete slab for soft subsoils to prevent post sinking.
G—Main cross beam of $1\frac{1}{4}$in. galvanised piping 5ft. long and bolted at centre.
H—Wire spacing of 10in.
I—Intermediate cross beam of 4in. x 2in. timber 5ft. long and grooved and loosely stapled to hold wires.

Training Vines on to Veranda Pergola





A—Pruning first year. Leader taken to top of trellis.
B—Pruning second year. Laterals laid down to form permanent arms from 2 top buds. All lower growth removed.
C—Pruning third year. Growth from arms cut back to 2-bud spurs.
D—Pruning fourth year. Growth from top bud of each spur cut back to form short bearer and growth from lower bud cut back to 2 buds to form new spur. Henceforth new short bearers are laid down each year from the spurs, which are likewise renewed. Last year's bearing wood is entirely removed each season.

and dusts, thus simplifying disease control.

Weak vines trained on the principle of extension require to be grafted on to a strong stock, such as Chasselas x Berlandieri 41B, Mourvedre x Rupestris 1202, and Baco No. 1. Chasselas x Berlandieri 41B is a particularly good stock deserving more extensive use, as it has a wide range of affinity, promotes productiveness, good fruit set, and colour on its scions. Baco No. 1 is a very good stock on clay soils, but it suckers badly, making extra work in removal of the suckers during the season. Mourvedre x Rupestris 1202 is in most common use and is a good all-round stock, but with some varieties on it the fruit does not set or colour well.

Weed Control Conference at Timaru

THE New Zealand Weed Control Conference will be held from 3 July to 6 July at Caroline Bay Hall, Timaru. The programme is as follows:—

3 July—"Weed Problems in South Canterbury" (J. L. Symons). "Sweet Brier Control" (A. R. Dingwall). "Barberry Control" (S. R. Hewitt). "Hawthorn Control" (D. L. Johns). "Railway Track Trials" (R. K. Ward).

4 July—"Nassella Tussock" (W. F. Leonard). "Cape Tulip" (D. I. Glue). "Progress in Suppression of Noxious Weeds" (F. Lovett). "Recent Work with Dalapon" (M. S. Foreman). "Recent Work in Management and Control of Gorse" (P. S. Ferens). Field trip in the afternoon. Public lecture in the evening: "Weed Control Overseas", by C. E. Iversen, Senior Lecturer in Field Husbandry, Canterbury Agricultural College.

5 July—"Crop Desiccation Trials" (one lecture by W. V. Hadfield and another by I. W. Murdoch). "Weed Control in Peas" (F. C. Allen). "MCPB in Canterbury" (P. W. Blomfield). "Brassica Weed Control in Southland" (T. G. Sewell). "Research Notes on Weed Control" (J. J. McLaughlin). "Clover Tolerance" (F. B. Thompson). "Weedkillers as an Aid to Pasture Establishment, Maintenance, and Renovation" (Miss S. M. Maclean). "The Use of Weedicides in Relation to Fat Lamb Production" (K. Lewis). "Weed Control in Lucerne" (J. N. Fitzgerald).

6 July—"Weed Control in Irrigation Races" (R. C. Schofield). "Weed Control in Drains" (J. N. Fitzgerald). "Place of Gamma Butyric Acids in New Zealand" (L. J. Matthews). "Work with Colloidal and Emulsifiable Acids" (R. L. Taylor). "Significance of Formulation and its Relationship to Selective Herbicide Efficiency" (S. W. Preston).

Sheep Losses Associated with Hot, Dry Weather

By R. M. SALISBURY,
Chief Diagnostic Officer, Department of Agriculture Animal Research Station, Wallaceville

DURING the hot, dry weather in Southland and Canterbury last December and January there were a number of serious mortalities in lambs and ewes. A similar case was recorded in the Manawatu, but this was the only one reported in the North Island. The cause of these deaths has not yet been elucidated and work is continuing. Meanwhile the known facts are summarised below and these enable recommendations to be made to prevent a recurrence.

THE main features of the mortalities may be enumerated as follows:—

1. Deaths occurred 2 to 4 days after yarding for weaning, drenching, shearing, etc., and continued in some cases for several weeks.
2. In the first reports deaths followed drenching with phenothiazine, which suggested that the drench was responsible. Later, however, similar deaths occurred in sheep which had not had phenothiazine and this excluded the drench as being primarily responsible.

   Several different brands of phenothiazine had been used and subsequent drenching trials in Southland and at the Animal Research Station, Wallaceville, using the same drench as had been associated with deaths have proved that the phenothiazine itself was not toxic to sheep and the safety margin is beyond the range of human error. Doses of up to 10oz. (10 times the normal) have been given without ill effects.
3. There was a substantial loss in weight of the surviving animals.
4. All cases were associated with very hot, dry conditions and the grass was drier than in normal years.
5. In a number of cases no drinking water was available and where it was provided animals were apparently very thirsty. Though it is well known that sheep can be raised on greenfeed in the absence of drinking water, and this is a common practice, particularly in Southland, in abnormally dry seasons such as the one just experienced drinking water is necessary. Lambs would require approximately ½ gallon of water per head per day.
6. The principal finding on post-mortem examination was an extensive kidney damage.

The drenching of lambs at weaning has become a habit rather than an essential. The weather at the time of these losses was highly unfavourable for the survival of worm larvae and a drench given when the dry weather broke would have been more profitable. Farmers should be guided by both the weather and feed conditions at the time of weaning before deciding whether a drench is required.

Phenothiazine is still the best all-round drench available for the control of worms in sheep, but it should be used at the correct time to achieve the best results. It has been used extensively throughout the world for the past 14 years without causing any serious losses in sheep, and the fact that experimental lambs were given up to 10oz. shows that it has a wide margin of safety.

Farmers are advised to continue with the use of phenothiazine, but not to drench during hot, dry periods, because at that time the likelihood of animals becoming parasitised is extremely remote.

EDITOR: A. G. G. HILL
THE JOURNAL OF THE BRITISH GRASSLAND SOCIETY

This Journal is a medium for the publication of the results of research and practical experience in the realm of Grassland Husbandry.

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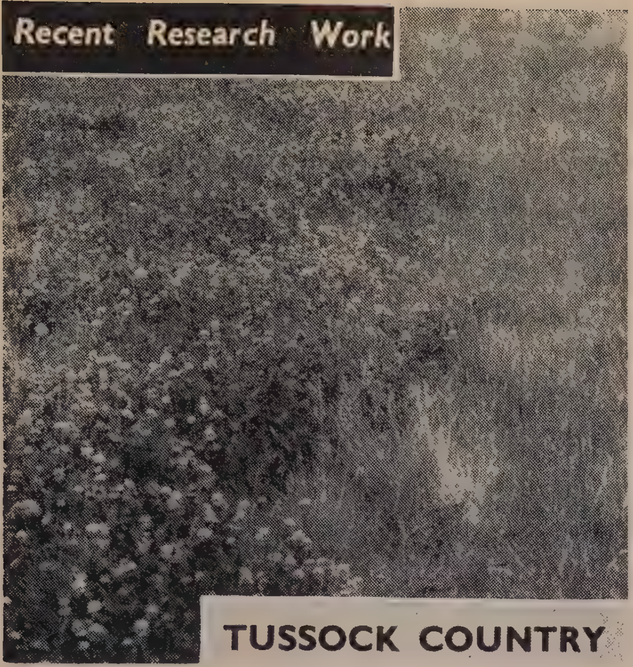
Recent Research Work



HEADING PHOTOGRAPH: Result of introducing clover into tussock sward at Broken River, Canterbury. Left—Clover introduced with grassland tips. Right—Natural vegetation.

TUSSOCK COUNTRY

TWO methods are being used by the Extension Division, Department of Agriculture, in trials for improving tussock country—the introduction of clover to be followed later by grass and the introduction of grass alone. The first method gives an increase in cover and production and the second an increase mainly in cover. Until recent years experimental work in tussock grasslands has investigated the value of different types of grasses, but now that aerial topdressing and oversowing have become such a general practice in New Zealand more attention is being paid to the possibility of using the same method of improving all types of tussock country.

INTRODUCTION OF CLOVERS

THIRTY trials have been laid down to examine the effect and value of introducing clover into tussock country. A range of clover species has been sown in the trials—the species commonly used in pastures, white, red, and subterranean, and those that have a more restricted use in pastures, alsike, strawberry, and zig-zag. The clovers have been sown with and without phosphate. On unploughable country they have been surface sown on the existing vegetation, and where land is fairly flat they have been drilled directly into the existing sward with the aid of special tips or with the sod-seeder, or broadcast after the area has been "Sunprong" harrowed.

ESTABLISHMENT

The initial strike is often very promising, but it is sometimes followed by a rather patchy establishment. This applies particularly to the drier, more depleted country, where conditions are most unfavourable for establishment. There is little remaining cover of the original tussock to protect the young clover plants from drying winds and severe frosts. Though only a relatively small number of plants manage to persist, natural reseeding usually takes place from these nucleus areas and a slow, gradual build-up of clover density takes place. On the higher-rainfall country a marked improvement in cover and feed has occurred within a short time as a result of oversowing and topdressing. Good results have been obtained with all methods of oversowing, but no method has always been successful. Where moisture is a limiting factor and cover is sparse the drilling of the clover into the existing sward encourages the germination of the seed and the furrows or drills protect the young plants. If a mat-like, twitchy cover of grasses is present the young clover plants suffer from the competition of the existing plants and the furrows tend to knit over very quickly, smothering the young plants. Sowing into the sward has given a better establishment than sowing after "Sunprong" harrowing.

CLOVER SPECIES

Alsike and white and red clovers are the most promising clovers. Successful establishment with alsike is not as difficult as with white clover, and alsike can survive severe frosts. It manages to establish itself in the bare patches between the tussocks. White clover establishes well, but is more easily frosted than alsike. With topdressing it is the most productive clover. Kentish white clover has proved itself to be a useful clover in tussock country. It is lower in production, but is more persistent than the New Zealand white clover under conditions of low fertility. Red clover (particularly Montgomery red clover) establishes well and produces an abundance of feed in summer when other clovers are showing the effects of dry weather. However, it becomes severely frosted in winter. Red clover plants grow in and around the fescue tussocks.

Oversowing with subterranean clover has given some disappointing results. This may be due to the inadequate quantity of phosphate often applied at the time of sowing and to the strain of clover used. The choice of a strain of subterranean clover suited to long cold winters has not been given much attention, and previous failures may be partly accounted for by the use of an unsuitable strain. Tallarook has given better results than the Mt. Barker strain. The value of zig-zag clover has been very limited owing to the poor seed setting ability of this clover. However, with the development of a new strain specially selected by the Grasslands Division, Department of Scientific and Industrial Research, for its seed setting ability more interest is being taken in this clover. It is very slow to establish, but does not become frosted. Inoculation has aided its establishment. It is possible that inoculation may be beneficial to the establishment of other clovers, and more trial work on this aspect is required. Strawberry clover is not as hardy or as productive as alsike or white clover.

TOPDRESSING

Topdressing is essential for the promotion of vigorous, productive growth. Clovers will establish without topdressing, but are not as productive or as palatable without fertiliser. Topdressed plots are often preferentially grazed. Differences in productivity owing to topdressing are more noticeable with a high-producing and high-fertility-demanding clover such as white clover. Red clover manages to produce fairly well under lower-fertility conditions than does white clover. Topdressing alone in higher-rainfall country results in a marked increase of volunteer white clover, but this clover is not as productive or as persistent as a certified type.

The results of experiments with topdressing and oversowing in tussock country are distinctly promising. On the dry, barren, sunny slopes results are likely to be disappointing, but a considerable improvement in cover and production will be brought about on the shadier, better covered slopes within a short time. White, alsike, and red clovers should all be oversown with about 2cwt. per acre of superphosphate. Fertiliser does not aid establishment, but it increases production. A high-fertility-demanding clover such as white clover may exist without phosphatic topdressing, but will not thrive. Good-quality seed of a high-germination capacity should be sown. Spelling for a few months after oversowing aids establishment and occasional spelling for seeding in summer assists spread.

—*SHONA M. MACLEAN*

MEADOW FESCUE

By SHONA M. MACLEAN,
Research Officer, Department of Agriculture, Wellington

IN England meadow fescue has proved a high-yielding permanent grass and is considered a useful grass to fill in the gaps in pasture production in summer and winter. Though the performance of meadow fescue in New Zealand has not compared favourably with that of perennial ryegrass in the past, renewed interest has been taken in this grass over the last few years with the selection of two new leafy and densely tillering pedigree strains of meadow fescue, S53 and S215. These two strains, products of the Welsh Plant Breeding Station, Aberystwyth, are available on the English market. S53 is a pasture type and S215 is an earlier-growing, hay type.

TWENTY trials have been laid down to ascertain the usefulness of these two strains of meadow fescue under New Zealand conditions.

Details of Trials

Meadow fescue was sown with white clover or lucerne and in more complex mixtures, where one or several of the following grasses were included as companion grasses in addition to clovers or lucerne: Perennial ryegrass, short-rotation ryegrass, Italian ryegrass, cocksfoot, and timothy. The seeding rate of meadow fescue varied from 30lb. per acre in simple mixtures to 5lb. per acre in complex mixtures.

Results with Different Mixtures

Meadow fescue was slow to establish. When it was sown alone with white clover individual plants were vigorous and well grown, but they did not become the dominant species in the sward. The sward was usually rather open, clover dominant, and allowed the ingress of weeds and weed grasses. Meadow fescue did not appear capable of forming a dense sward on its own and appeared to require a companion grass.

The ryegrasses proved to be too aggressive as companion grasses.

When meadow fescue was sown with a quick-growing, competitive ryegrass (such as short-rotation ryegrass) it almost failed to establish; only a trace to 5 per cent. of meadow fescue was present in the sward. In the most recent trials laid down seeding rates have been based on English recommendations and the slow-establishing grasses cocksfoot and timothy and clovers have been included. Interim results have indicated better establishment of meadow fescue with these two non-aggressive companion grasses than with the ryegrasses.

The fact that meadow fescue was slow to establish, allowing the sward to become clover dominant, was found to be advantageous in one trial in the Maniototo district. The perennial ryegrass : short-rotation ryegrass mixture and the meadow fescue mixture were grazed in the spring after the early autumn sowing and then closed for hay, which was cut in January. The meadow fescue mixture gave a better yield and provided an excellent sward (with a high proportion of red and white clovers) for aftermath grazing. Both ryegrasses were low yielding at this stage and provided a very poor aftermath with little clover.

Under fertile conditions meadow fescue is proving to be a good companion grass for lucerne. In trials both lucerne and meadow fescue established well, with a good balance of lucerne and meadow fescue in the sward. Meadow fescue did not suppress the growth of the lucerne, but suppressed the weed grasses to some extent. The mixture recovered well after grazings, meadow fescue having a similar rate of recovery to lucerne. S53 appeared to be slightly slower in recovery than S215.

Production

When meadow fescue was compared with perennial ryegrass under moist, fertile conditions the ryegrass mixture gave better yields than meadow fescue during autumn, winter, and early spring, but the meadow fescue mixture was more productive than ryegrass during midsummer. After ryegrass had run to seed and become dormant in midsummer, meadow fescue remained green and vigorous and provided good feed. The dry-matter yields of one trial carried out at the Winton Experimental Farm are quoted to show how meadow fescue outyielded perennial ryegrass during midsummer.

The total yield from autumn 1954 to summer 1955 was 8980lb. per acre for the perennial ryegrass mixture and 8450lb. per acre for the meadow fescue mixture.

Meadow fescue produced coarse but palatable feed. In several trials sheep consistently preferred the meadow fescue mixtures to the perennial ryegrass ones and kept them closely and evenly grazed.

COMPARISON OF DRY-MATTER YIELDS OF A PERENNIAL RYEGRASS MIXTURE AND A MEADOW FESCUE MIXTURE

Date of cut	Perennial ryegrass paddock Total yield	Yield of ryegrass	Meadow fescue paddock Total yield	Yield of meadow fescue
	lb. per acre	lb. per acre	lb. per acre	lb. per acre
17/11/54	630	378	700	420
6/12/54	480	288	840	504
20/12/54	320	165	450	247
4/1/55	1,170	761	1,170	585
31/1/55	680	306	790	237
18/2/55	760	608	610	214

Under fertile conditions meadow fescue is a good companion grass to sow with lucerne for grazing.

Meadow fescue has appeared to be not as persistent as perennial ryegrass.

Possible Uses

Evaluated on its performance under New Zealand conditions, meadow fescue cannot be considered as an alternative grass to perennial ryegrass. However, it appears to be of some value for two purposes:—

Summer grazing: As meadow fescue outyields perennial ryegrass during December, it assists in smoothing out the unevenness in pasture production in summer, when perennial ryegrass is relatively low producing. Meadow fescue does not form a dense sward when sown alone with clover, but appears to be better when sown with a non-competitive companion grass such as timothy or cocksfoot.

Companion plant for lucerne: Meadow fescue is a good companion grass to sow with lucerne for grazing under fertile conditions. It suppresses weeds and weed grasses without competing with the lucerne, makes vigorous growth after grazing, recovers at a similar rate to lucerne, provides palatable additional feed, and like lucerne is most productive in summer.

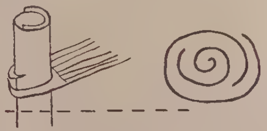
Further trials will be carried out to investigate the usefulness of meadow fescue in pasture production.

Identification of Meadow Fescue

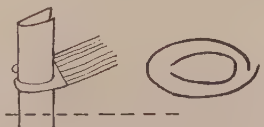
DIFFICULTY is often experienced in identifying meadow fescue because of its similarity to the ryegrasses in the non-flowering stage, and small differences in botanical characteristics have to be used to distinguish it.

1. To Distinguish Meadow Fescue from Perennial Ryegrass

Compare the young shoots and the arrangement of the young leaf blades (called leaves) within the sheaths of the shoots. Differences in leaf arrangement can be seen by taking cross-sections of the young shoots just below the junction of the leaf blade and the sheath (see diagrams below).



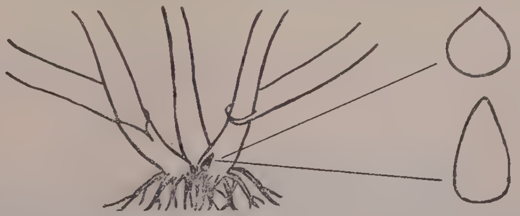
Meadow fescue: Leaves are rolled and the shoot is round just below the base of the leaves.



Perennial ryegrass: Leaves are folded and the young shoot is distinctly compressed into an oval just below the base of the leaves.

2. To Distinguish Meadow Fescue from Short-rotation Ryegrass

Short-rotation ryegrass is very similar to meadow fescue; the leaves are rolled and the shoot is round. A method that has been used for identification is the **shape of the small, dormant buds** of the future shoots at the base of the plant (see diagrams below).

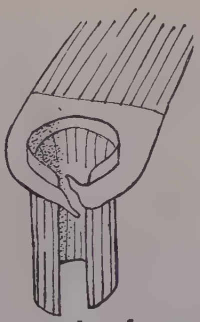


Meadow fescue: Short and stumpy.

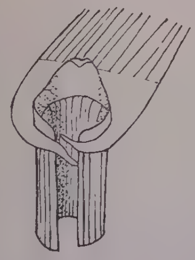
Short - rotation ryegrass: Elongated.

However, in the field this is not an easy or practicable method of identification, as dormant buds are not always present, when present are often difficult to find, and once they begin to grow differences in shape are no longer noticeable. Small differences in **shape** and **texture of the ligules** have been found to be of value for distinguishing short-rotation ryegrass from meadow fescue.

Shape of Ligules



Meadow fescue: Blunt; sides almost as long as the middle portion.



Short - rotation ryegrass: Shorter at the sides than in the middle. It therefore tends to have a peak in the middle.

Texture of Ligules

Meadow fescue: Rigidly membranous and slightly opaque. When the leaf blade is pulled away from the sheath the ligule, not being as delicate as that of the ryegrass, keeps its cylindrical shape, standing up as a short, stiff collar.

Short-rotation ryegrass: Thinly membranous like thin tissue paper. It adheres closely to the sheath, and as it is transparent, it is not noticeable until the leaf blade is pulled away from the sheath. The middle of the ligule then puckers into an angular fold.

The ligules of short-rotation ryegrass are usually a little longer than those of meadow fescue, particularly in the middle portion. Italian and perennial ryegrass have the same type of ligule as short-rotation ryegrass.

3. Other Differences

At certain seasons of the year when short-rotation ryegrass is growing vigorously (for example in late winter or spring) meadow fescue tends to be a duller green, harsher in appearance, and sometimes more prostrate than short-rotation ryegrass.

Once in flower head meadow fescue is easily distinguished from the ryegrasses. It has a branched inflorescence, whereas that of any type of ryegrass is a single, unbranched inflorescence.

There are no noticeable differences in the botanical characteristics of the S215 and S53 strains of meadow fescue, but they differ in their type of growth. S215 grows more rapidly than S53 in the early establishment stage of the pasture, recovers more quickly after grazing, but does not appear to be as persistent as S53.

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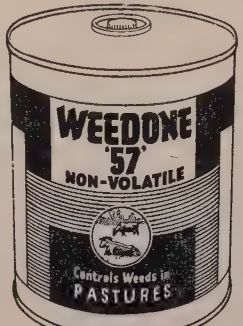

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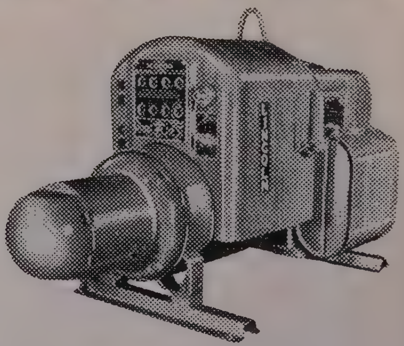

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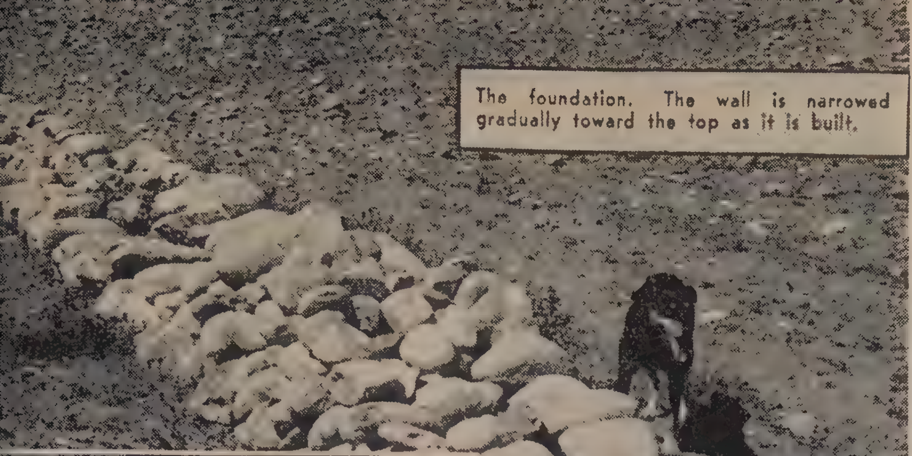
Profitable Method of Clearing Boulders from Land

DURING the war Mr. B. J. Woods, a Takaka farmer, began breaking in some rough, scrubby country at Hamama. This country is stony with many large boulders. The problem of disposing of these big stones before final cultivation could be done was not an easy one. Wire for fencing was at that time unobtainable and fences were necessary, so Mr. Woods conceived the happy idea of making stone walls to take the place of wire fences.

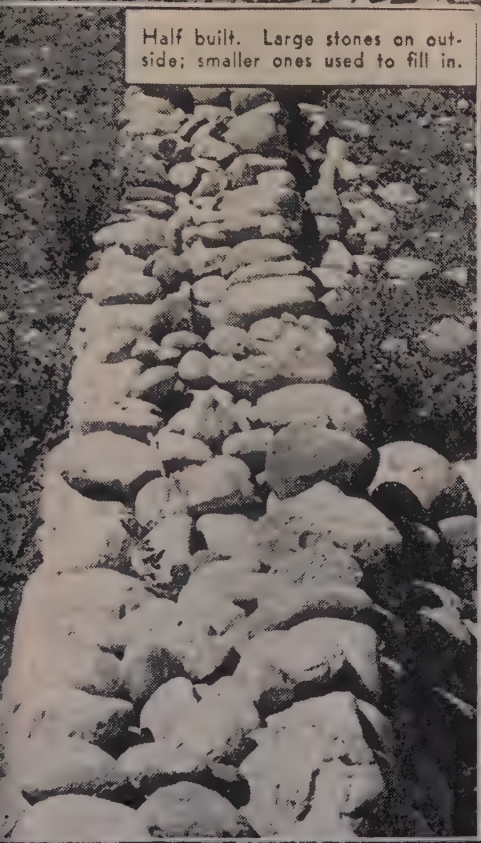
He set to work with two men to cart the stones to the fenceline, where he did the building. The cost of the first wall surprisingly totalled only 8s. per chain more than would a post and wire fence erected in the orthodox manner.

At the same time as the wall was built the paddock was cleared. Since then more and more stone walls have been built as the opportunity offered. This is an example that could well be followed by other farmers in this and other districts. Large heaps of stones throughout paddocks are a considerable nuisance when cultivation is being done and do not enhance the appearance of a farm. When formed into walls stones provide stockproof fences and shelter at little more cost than that of the carting and at the same time give any farm a neat appearance.

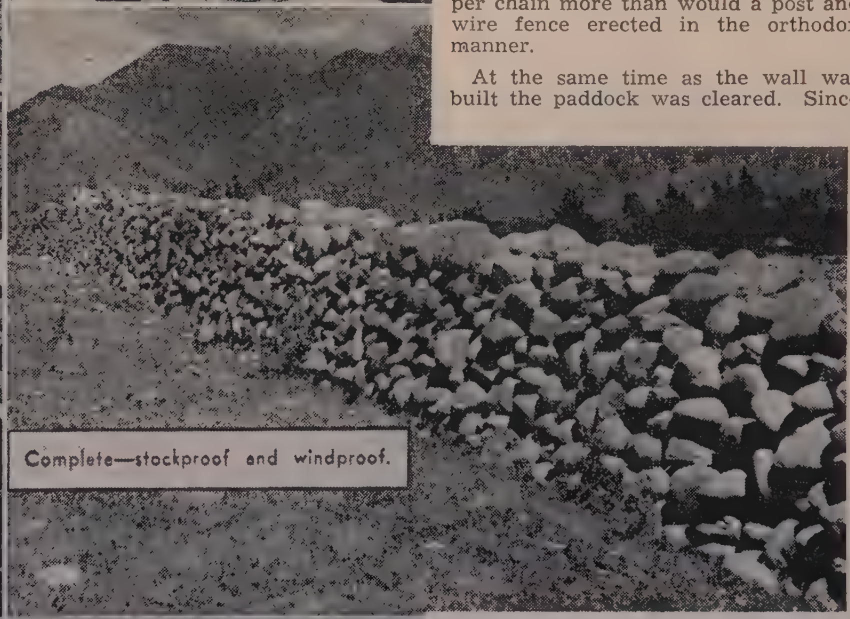
—R. INCH,
Fields Instructor,
Department of Agriculture,
Nelson



The foundation. The wall is narrowed gradually toward the top as it is built.



Half built. Large stones on outside; smaller ones used to fill in.



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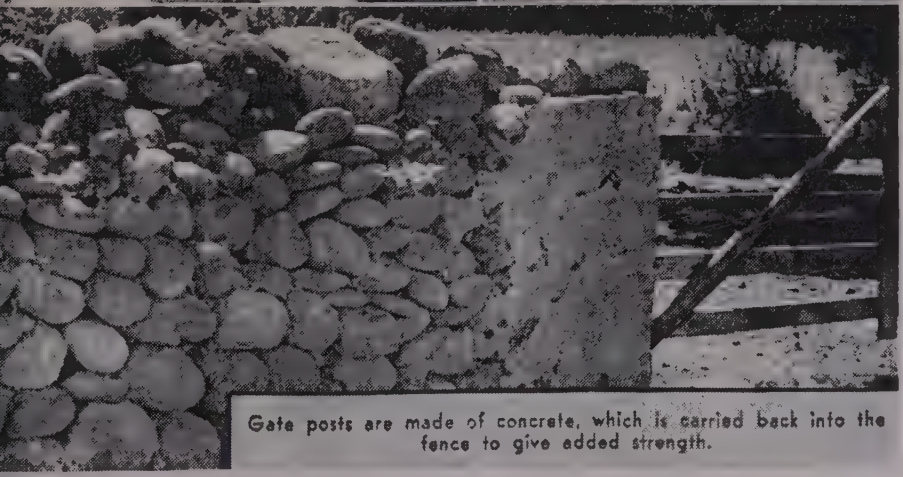
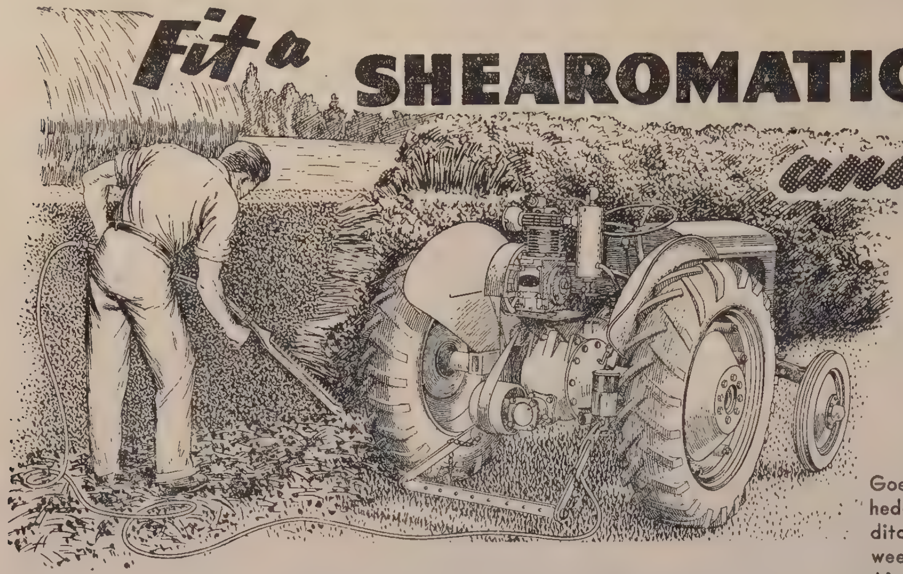


Gate posts are made of concrete, which is carried back into the fence to give added strength.



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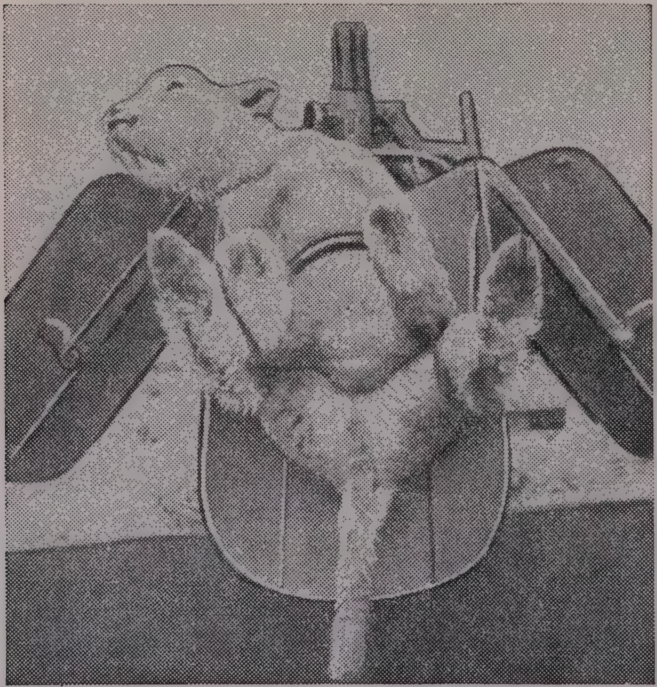

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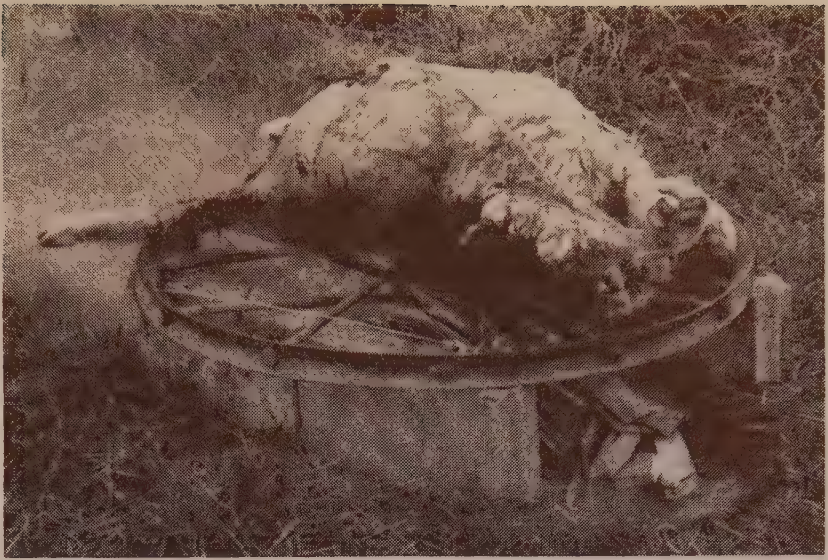
Disposal of Dead Sheep

By C. A. MARTIN,
Livestock Instructor, Department of Agriculture, Tapanui



Carcasses are easily burnt, and a good method is illustrated here.

MANY dead sheep rotting where they have died in their paddocks are evidence that there could be much improvement on many farms in the disposal of these carcasses. Some farmers dump dead sheep into the nearest gully; others gather them all up and throw them into a communal dumping place which may be in any large hole or gully. These methods are not satisfactory, for every carcass not properly disposed of is a potential danger to the lives of other sheep. A sheep which has died of blackleg or any other similar disease and which has been left lying about can seriously infect the ground where it is lying with germs which are a danger to other sheep for a great many years. With the great increase in the numbers of sheep being carried on farms stock are so concentrated that the proper disposal of dead animals is more essential than ever.

SIXTY-THREE years ago J. A. Gilruth, the first official veterinarian appointed in New Zealand, wrote: "As a rule, when the New Zealand stockowner finds a few of his lambs dead from any cause whatsoever, he either allows them to lie till they rot completely away, or, if he considers himself a careful man, he throws them into the nearest swamp or dry creek."

Persistence of this policy under more and more intensive farming conditions has resulted in widespread contamination with septic organisms that cause heavy mortalities and necessitate vaccination.

Carcass Dumps are Dangerous

The dumping of carcasses into gullies either singly or at a common dumping place can be regarded only as a means of getting them "out of sight, out of mind", and is very little better than leaving them in the paddocks to decay.

The following shows what can result from this manner of carcass disposal. A farmer used an excavator to clean out a small stream which flowed through his property; then to remove the resultant unsightly heaps of mud along the sides of the stream he spread them by grader and harrows over his paddocks. In one of these paddocks was a mob of 500 2-tooth ewes and within 4 days he had lost about 50 of them. Blackleg was the cause of these deaths. All the dead sheep had teeth erupting, and the blackleg germs presumably had come from the ground and entered the sheep through the injured gums.

The small stream that had been excavated originated from a spring at the head of a gully not far away, and also at the head of this gully close to the spring was the communal dumping place for all sheep which had died in this part of the farm over the years. It is logical to assume that infection had seeped down the watercourse and with the excavation had been spread on the paddock, thus causing the deaths of 50 valuable sheep. Many similar cases could be quoted.

Dead sheep may be buried, but if they are, they should be buried deeply, so deep that there is no possibility of future cultivation bringing any part of them and their germs to the surface again.

The writer once watched a Dutch immigrant farm worker burying a dead ewe. The hole that he dug was the full depth of the spade (the handle and the blade) plus the depth of the blade (that is about 3½ft.); he put the sheep into the hole and then with the spade skimmed off the ground the blood or material that had exuded from the ewe; then he filled the hole in, tramping the soil regularly; and finally he mounded the remaining soil and placed the sods on top.

It was a job well done, and no doubt was the result of centuries of experience in Holland, where the land is so closely settled. When he was commended on the job he had done this Dutch lad stated that he had done it in the way he had been taught, and that he had seen many sheep buried in New Zealand, and the next day, as the result of dogs scratching, portions of the sheep could be seen above ground. Unfortunately this latter statement is all too true; many sheep are buried, but many graves are far too shallow.

Burning Carcasses Best Method

The most satisfactory method of dealing with dead sheep is to burn them. Despite what many farmers think, carcasses can be burnt very easily, and all that remains is a small heap of charred bones and ashes, all potential infection dangers being destroyed.

On a one-man West Otago farm carrying 900 sheep the following carcass disposal scheme is carried out with great success. When any sheep dies it is collected as soon as possible on a special dead-sheep sledge pulled behind a tractor. The carcass is never touched by hand, but a length of baling twine is looped around a leg and the carcass is moved by this. At lambing time this precaution is particularly important.

All carcasses are transported to one place—a mound in the corner of a paddock—and here they are dragged off the sledge by the twine. If they are plucked, this is done by a younger member of the family who would not otherwise touch sheep.

DISPOSAL OF DEAD SHEEP . . .

When a few carcasses have been collected, and when a breeze is blowing, the burning is begun. At this place an old grubber wheel has been laid on four 12in. by 8in. concrete blocks to make a "platform" 8in. above ground level. Up to three carcasses are placed on the wheel and a small fire of kindling wood is lit underneath them. Very soon the bodies begin to burn. The fat dripping from them keeps a fire burning underneath, and the burning continues until the carcasses are wholly destroyed. It is sometimes necessary to throw more wood or other material underneath to ensure that the fire is maintained, and the spraying of the carcasses with inflammable material would greatly assist the burning. If more than three carcasses have to be burnt, an additional few can be piled on as soon as the lower ones are well alight, but this method is mainly for dealing with a small number of dead sheep regularly.

On another farm in the same district there are more than 4000 sheep and the problem of carcass disposal is magnified accordingly. The staff employed makes it possible for one man to do this work, and this man would not be working with sheep regularly. All dead sheep are carted by a special sledge, used for nothing else, to a spot at the head of a gully which runs upward away from the direction of the prevailing wind. Any material such as branches trimmed off trees, old tyres or tubes, and anything that will burn is placed with the carcasses. On a day when a suitable wind is blowing up the gully some diesel oil or power kerosene is sprayed over the pile and the bonfire is lit. The heat generated by this fire is terrific and the carcass destruction is complete within a few hours. All that remains of perhaps 40 dead sheep is a pile of ashes that crumble into dust when trampled underfoot. If the same carcasses had been left to rot where the sheep had died in the paddocks, there would have been 40 more places on the farm where it might have been possible for other sheep to pick up infection over many years.

These two methods have been used very successfully, but there are many variations which could give the same results. These would be more particularly for burning small numbers of carcasses. Iron rails can be used across a pit; carcasses can be piled on top of the frame of an old grubber or anything similar. For burning a small number of carcasses the main thing is to get a draught under them and keep a small fire burning at ground level; with a large number auxiliary firing plus a strong wind greatly facilitates efficient burning.

Experience has proved on many farms that the burning of carcasses is the easiest method of disposal, and there is not the slightest doubt that as a means of preventing spread of disease it is by far the most effective.

Plastiproofed, Rubber-lined Hose for Irrigation

FARMERS either contemplating installation of or already using high or medium pressure, revolving spray irrigation equipment should consider the use of hose as an alternative to aluminium pipe as a spray supply line.

THIS hose with snap or screwed couplings, lightness, and flexibility offers many advantages when a spray head has to be moved.

The disadvantages of ordinary canvas hose normally associated with fire fighting are, first, deterioration and decay due to mildew caused by dampness. For this reason it is necessary to dry ordinary canvas hose thoroughly after use and before storage. Secondly, canvas hose pulled along the ground is subject to abrasion, which causes weakness and subsequent rupture.

Both these disadvantages have been removed from fire hose by modern methods of manufacture. Hose is now available with a nylon weft and cotton warp for strength and rubber lined on the inside as a protection against moisture. It is also plastiproofed on the outside as a protection against abrasion and the formation of mildew.

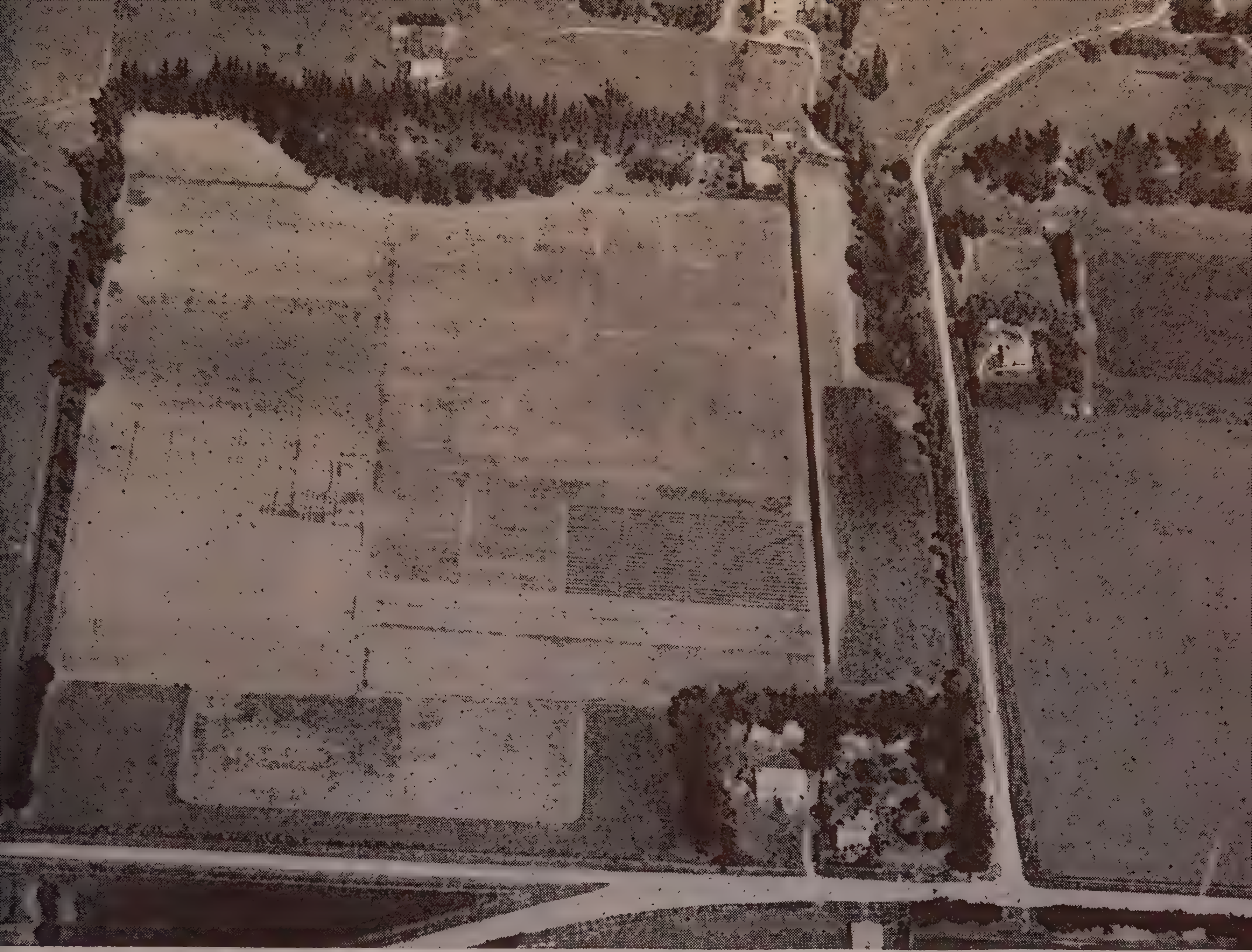
This hose can receive the same treatment as ordinary rubber garden hose and with normal care will not deteriorate much more. It is available in 1½in., 2in., 2¾in., 3in., 3¾in., and 4in. sizes; 2¾in. and 3¾in. are standard sizes readily available, the remainder being procurable by import.

As very few couplings are required for a length of hose line, the price compares more than favourably with light-weight aluminium tube lines of the same length and equivalent size.

The illustration shows this type of hose in use for spray irrigation by a municipality.

—*H. W. T. EGGERS,*
Engineer,
Department of Agriculture,
Wellington

Photograph by Hope Cross.



▲ An aerial view of the farm, which has a total area of 35 acres. Auster Air Services photograph.

The Moa Seed Farm

THE Moa Seed Farm, 5 miles south of Roxburgh on the main Dunedin-Queenstown highway, is remembered by holiday visitors for the blaze of colour produced by the large areas of sweet peas grown for seed. This farm was first started by the then Repatriation Department shortly after the First World War, and in this article D. W. Wilson, Horticultural Instructor, Department of Agriculture, Roxburgh, outlines the history of the farm and describes the cultural methods adopted for some of the main seed crops.

THE Moa Seed Farm, which originally consisted of about 500 acres of arable land, was taken over by the Repatriation Department from the Westcott Estate in 1919 for the training of returned servicemen in flower and vegetable seed production. When established the farm was also used for experiments, and extensive field experiments with root crops and to a less extent wheat and lucerne were conducted. Up to the end of 1921 about 100 acres were under cultivation for vegetable and flower seed production and experiments. The remainder of the farm was devoted to sheep.

As a training farm the venture was not a great success and with the emphasis on seed production, flower seeds in particular, production was far in excess of New Zealand's requirements.

Change of Management

Rather than see the farm close down, and possibly to give the production of flower and vegetable seeds further trial, a syndicate approached the Repatriation Department and leased the property for 5 years. This syndicate consisted of Mr. J. W. Hadfield, who managed the property for the Repatriation Department and later for the syndicate, Messrs. James Begg, the late E. F. Duthie, the late J. H. Nimmo, and R. B. Tennent, Department of Agriculture, who had been associated with the farm since its inception. Mr. Hadfield introduced seed certification in New Zealand, which was first started on an unofficial basis at the Moa Seed Farm.

This syndicate was known as the Moa Seed Farm Association, and under its management all farm work was organised on a sound commercial basis. For the continuance of certain experimental work which ultimately ceased the Government paid the salary of a trainee. The main crops grown for seed during this period included wheat, oats, barley, ryegrass, onions, beans, garden peas, carrots, and parsnips. Of the large number of flower seeds grown by the Repatriation Department only sweet peas were retained.

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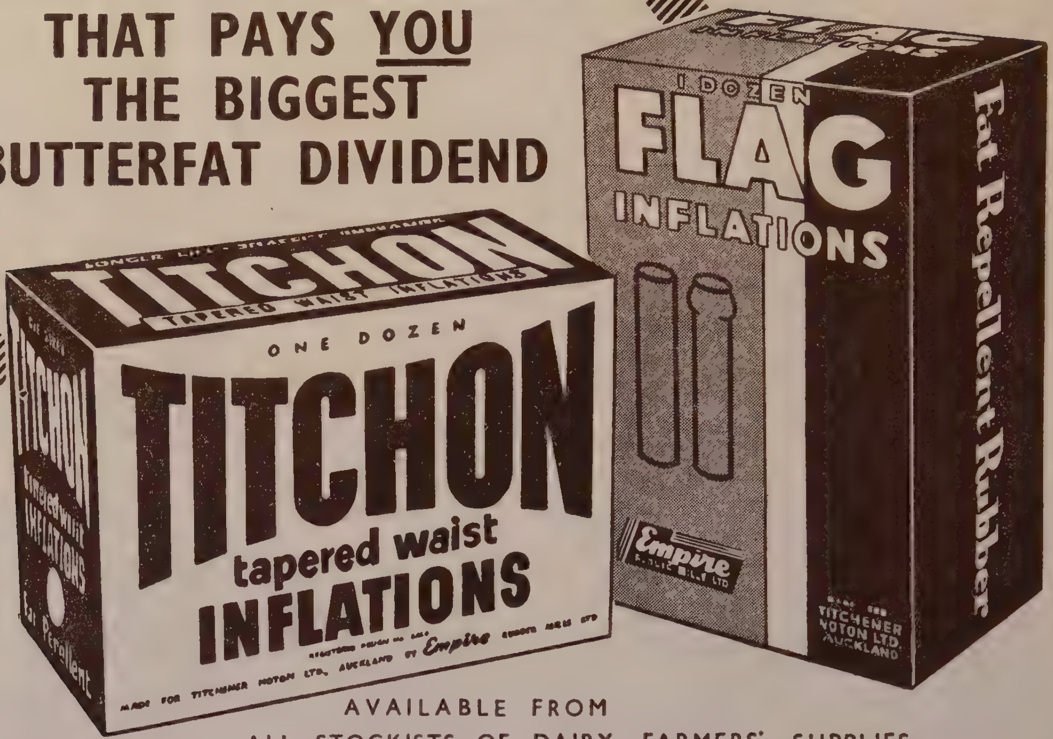
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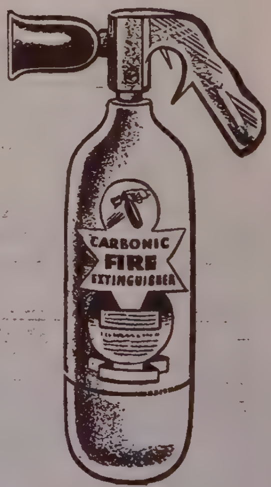
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At the expiration of the 5-year lease the property reverted to the Government, and the Department of Lands and Survey allotted various sections to neighbouring farmers who were short of the arable land necessary for the efficient management of their farms. Approximately 100 acres, including the manager's residence, was made into a separate farm, and the homestead block of 35 acres was taken over by Messrs. F. D. Barron and J. L. Dance. Mr. Barron was an original Repatriation Department trainee and Mr. Dance started as a cadet when the association was first formed. They took over Mr. Hadfield's lines of pedigree seeds, and it was their intention to carry on with selected lines of vegetable and sweet pea seeds commercially, specialising particularly in garden peas, broad beans, carrots, parsnips, onions, beetroot, and lettuce. However, owing to the restricted area of 35 acres, to maintain purity in certain crops it was found necessary to grow only one variety of each species annually.

The purity of strain of the crops grown, with the exception of peas and beans, was maintained by rigid single plant selection, and with the exception of new introductions the lines grown originated from those selected by Mr. Hadfield. By the continued application of these methods purity and quality of strains have been maintained at a very high level. With peas and beans lines have been maintained by the heavy rogueing of small areas sufficient for the farm's own seed requirements. Sweet peas are similarly treated, but in addition care is taken to ensure that vigour and quality of bloom are maintained. In the improvement of sweet pea varieties strains were often selected from individual plants of exceptional merit.

A year or two after Messrs. Barron and Dance took over the property a small but very representative selection of tulip bulbs was secured from a very reliable Dutch source. These bulbs with later introductions of newer varieties formed the nucleus of the present extensive areas grown for the bulb and cut flower trades.

Still later a small quantity of gladiolus corms was obtained, but these have never been grown on as large a scale as the tulips. The varieties grown were and still are the older, well-proven ones, and no attempt has been made to keep abreast with the numerous new varieties introduced annually.

White carrots lifted from single plant selection plots and lined out for assessment.

During the Second World War, because of inability to procure sufficient seeds from overseas, New Zealand was forced to become more self-supporting. A special Priority Seeds Committee was formed and under its direction production was appreciably increased at the Moa Seed Farm by leasing small areas of land from neighbouring farmers. Crops grown during this period included beetroot, beans, carrots, onions, peas, and parsnips. In one season 7 tons of parsnip seed was produced.

Mr. Barron retired from the business in 1948, and Mr. Dance in 1952. At present it is being carried on under the ownership of Mr. R. H. Dance, who first entered the business on Mr. Barron's retirement.

Owing to scarcity of labour and overseas competition the growing of seeds on a large scale is in the meantime being discontinued and emphasis is on the cultivation of gladioli and tulips.

Parsnip and beetroot selections.

Single Plant Selection

Mr. Hadfield was responsible for the introduction of single plant selection methods on this farm. Messrs. Barron and J. L. Dance both worked under him and, realising the importance of these methods, used them where applicable to all seeds produced. They can be effectively applied to a large number of crops, but the following is a description of their application to root crops from the beginning of seed production.

First Season

A good strain of seed is secured and sown out in the normal way. In autumn when the roots are mature they are lifted and the crop thoroughly searched for a number of excellent specimens. These are then carefully inspected and by elimination the number reduced to say 24 even roots with all desirable characteristics. These 24 roots are then carefully stored over winter. So that commercial seed production can be undertaken the following season a sufficient number of roots for requirements are then selected and stored over winter.

Second Season

In spring the 24 selected roots are planted out in the middle of a block of the same variety for commercial seed production to obviate outside influences. When the seed is mature a small portion of the seed heads from each of the 24 plants is collected and stored separately. The balance of the seed of the 24 plants is harvested and used for sowing out in the following season's commercial seed production area.

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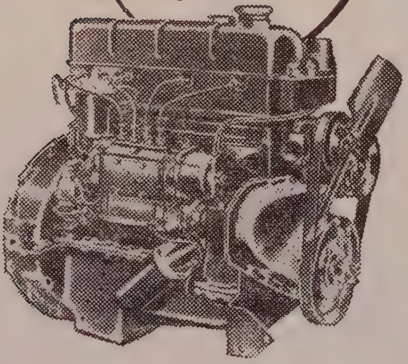

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Annual Loss From Hydatids In Sheep Put At £750,000

AUCKLAND, February 10 (P.A.).—Losses through hydatids in sheep and lambs were probably costing the New Zealand meat industry about £750,000 a year, said the chairman of the Meat Board, Mr. J. D. Ormond, in an address to the annual conference of the New Zealand Veterinary Association at The Chateau today.

...how much was *your* loss?

Dogs spread hydatids

Dogs, although not themselves subject to hydatid cysts, can pick up hydatid tapeworms, mainly from eating raw offal. In their droppings, the dogs scatter hydatid eggs which, as dust, are blown on to pasture or adhere to the coats of animals and so reach human hands.

Simple precautions

1. Always boil raw liver, lungs, etc., before feeding to dogs. Otherwise bury or burn all offal.

2. Dose your dog every three months with Arecoline, the vermifuge supplied with your dog license.

3. After handling animals, never put hand to mouth without washing.

4. Be sure children wash hands before every meal.

5. Wash thoroughly all vegetables and fruit eaten raw.

Your co-operation is necessary . . .

DOSE YOUR DOG REGULARLY

17.55a

An announcement from the N.Z. Department of Health

Third Season

In spring the seed selected from individual plants is sown out in separate rows under ideal conditions. A close watch is maintained throughout the growing season for behaviour, variation in type, etc. Notes are taken and any row exhibiting undesirable characteristics is eliminated. In autumn these selection plots are lifted in one operation and the product of individual rows is carefully inspected. With the assistance of the notes taken during the growing season and by a process of elimination the best all-round row is left and from this row 24 roots are selected and stored over winter. The balance of the roots from these selection plots are stored and planted out in spring to supplement the commercial area.

Fourth Season

In spring the 24 roots selected the previous autumn from the best selection plot row are planted out, again in the middle of a commercial seed production block. When the seed is mature a small quantity is collected from each plant and sown in selection plots as previously described. Here again the balance of the seed from the 24 selected plants is harvested and used for sowing out in the following season's commercial seed production area.

After this system has been in progress a number of years the seed used for the sowing of commercial seed areas is only two generations removed from a single selected plant. Its continued use ensures that purity and quality of the seed produced are at least maintained if not improved, as without selection the proportion of undesirable off-types would be likely to increase.

Root crops are biennial; from seed to seed occupies two growing seasons, so that to harvest seed annually it is necessary to sow half of the seed originally secured the first year and the remainder the next.

Main Seed Crops

In recent years parsnips and sweet peas have been the main seed crops grown, for which the cultural methods are as follows:—

Sweet Peas

Sweet peas have been grown at the Moa Seed Farm since its inception in 1919, when the Spencer varieties were coming into favour, replacing the old Grandiflora types. Varieties have been kept up to date by new introductions from overseas as they are proved in the National Sweet Pea Society trials in England.

Sowing: Both the summer and early flowering types are grown, the latter being well suited to areas where there is winter growth and comparatively few frosts. Under ideal conditions early flowering varieties sown in autumn will flower profusely during winter. For seed production early flowering varieties are spring sown, as they do not tolerate Central Otago winters. Summer flowering varieties, however, are autumn sown (March), as seed production is higher and seed quality superior to that of spring sown.

Originally, named varieties were sown in double rows 18in. apart with 8ft. between double rows and the plants supported with 5ft. lengths of manuka scrub. This method produced excellent results, but owing to the high labour costs was discontinued. At present named varieties are sown out in rows 28in. apart in small blocks. Rows are always of a standard length (about 28yds.) to allow easy working. The distance between blocks is about 5ft. to 6ft. all round to allow easy access during cultural operations, particularly harvesting, as varieties mature at different times. At sowing an attempt is made to produce an effective colour scheme, the over-all effect of which during blooming is similar to that of a patchwork quilt.

For the production of seed for selling as mixed varieties seed is sown in drills 28in. apart either as a mixture or in separate blocks of colour groups. After harvesting seed is blended. The seed used for sowing out blocks of mixed varieties is blended from selected named varieties. This is important, as some varieties are more prolific seed producers than others and if seed were saved from mixed blocks for sowing, one or two varieties would ultimately predominate in the mixture. Similarly in the blending of varieties for mixed sowings a knowledge of the seed producing capabilities of the varieties used is essential.

Weed control: Chemical weed control has not proved entirely satisfactory in Central Otago. Weed control therefore consists of light hand raking over the rows just as the peas emerge and then periodic wheel hoeings and at least one hand hoeing. When the plants are 12in. to 15in. high they are earthed up to smother weeds. This is delayed as long as possible, as further weed control is impractical.

Rogueing: Shortly after the first flowers appear and at intervals throughout the flowering period, off-type plants are removed to maintain a high standard of purity.

Harvesting named varieties: If time and labour permit, the first mature pods are picked by hand and separately dried in racks of scrim-bottomed trays placed in a sheltered position. When thoroughly dry they are placed in sacks (half filled), tied, laid out in a row, and threshed by frequent crushings with a tractor-drawn Cambridge roller.

When the bulk of the pods are mature in each variety block, the haulms are cut immediately below the soil surface with an adapted horse scuffler. Eight rows are then made into one, rolled into a series of heaps staked to anchor in case of wind, and labelled. Depending on weather these heaps are turned 2 or 3 days later and when partially dry made into small stacks in a sheltered position and covered. When thoroughly dry the haulms are put through a small threshing mill which is easily cleaned after each variety. Further treatment consists of cleaning the seed in a small seed cleaning plant, sieving, and, after a final hand picking, polishing.

Harvesting mixed varieties: Blocks of mixed varieties or colour groups are harvested similarly to named varieties, but without the detailed attention necessary with named varieties.

Production: Depending on the season, production varies between 400lb. and 900lb. of dressed seed per acre.

The sweet pea seed produced on this farm is sold throughout New Zealand and in Australia and occasionally in England. The fact that a well-known English firm has sent out small quantities of seed for bulking or increasing is adequate testimony to the purity and quality of the seed produced.

Parsnips

As they are biennials, parsnips require a minimum of 13 months for seed production. The method adopted on this property is known as the steckling method, in which seed is sown late in the growing season, and plants are left in the ground over the winter and harvested the following autumn. This has many advantages over the transplanting method, in which an area is sown in the normal way in early spring and the roots are lifted in autumn, selected, and stored for planting out the following spring. Advantages of the steckling method are:—

1. A minimum amount of labour is required, as lifting, selecting, storing, and planting out of roots are avoided.
2. Seed losses caused by winds blowing the plants over are considerably reduced, as the plants are better anchored through not having been disturbed.
3. The time taken from sowing to harvest is reduced by about 3 months.
4. Seed matures more evenly.
5. Production is as high and maturity as early as in transplanted blocks.

Single plant selection methods are essential to the steckling method of growing a crop for seed, as rogueing is not possible; the roots, being small, are never lifted.

Sowing: With the steckling method selected seed is sown thinly (to obviate hand thinning) in December or early January in drills 32in. apart.

The rate of sowing is 2lb. to 3lb. per acre.

Weed control: Normal inter-row cultivation methods are adopted and in the season after sowing cultivation is only very shallow, as otherwise considerable damage to the root systems can result. One or two hand hoeings are usually necessary to suppress weeds in the rows.

Harvesting: The seed usually matures in January or early February and is harvested immediately it is ready, as drying winds at this stage can cause heavy losses. The crop is cut with a back delivery mower and left in a series of untied sheaves of a size convenient for later handling. These untied sheaves are left lying for up to 7 days, depending on the weather, and then completely turned over in the early morning when damp (to avoid seed loss) so that drying and colouring of seed may be completed. This operation is essential for the production of good-coloured seed, as parsnip seed can dry to a green colour, which detracts from its appearance, though quality is not impaired.

When thoroughly dry the seed is extracted by an ordinary header harvester and after machine dressing is ready for market.

Production per acre varies considerably and a delay in harvesting of one day can cause seed losses of over 50 per cent. Crops of 25cwt. per acre have been secured, but the average is about 15cwt.

Central Otago is ideally suited for the production of parsnip seed, as insect pests which in other areas markedly reduce production are rarely of any consequence.

Production

The Moa Seed Farm's production for the 1954-55 season is as follows:—

Tulip bulbs: 90 varieties; 250,000 saleable bulbs.

Gladiolus corms: 35 varieties; 30,000 saleable corms.

Parsnip seed: Hollow Crown variety; 4 tons.

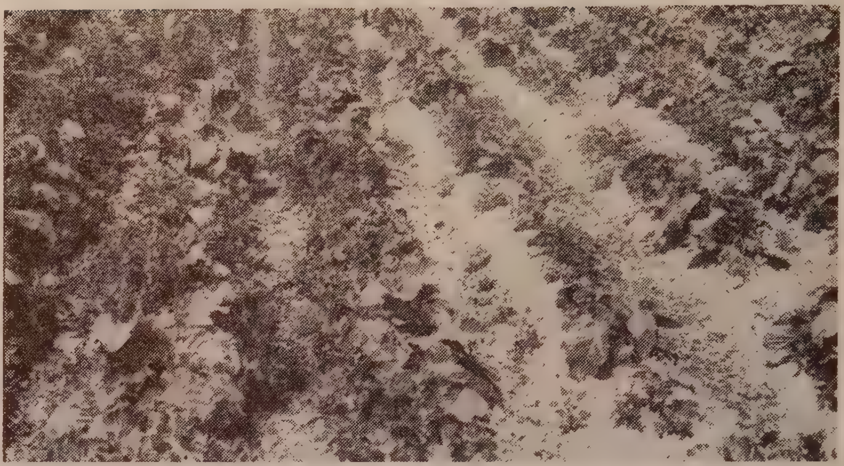
In addition 120,000 tulip blooms were forwarded to North Island markets and large quantities of gladiolus blooms to nearby South Island markets.

Much of the 35 acres is at present in grass, which is mown periodically and left to build up the soil. The grassed-down areas will later be used rotationally for the growing of bulbs, corms, and selected lines of seed.

Acknowledgment

The information given by Messrs. J. L. and R. H. Dance in the preparation of this article is acknowledged.

Control of Fat-hen in Chou Moellier



▲ Left—Unsprayed area. Right—Fat-hen controlled by spraying.

EXCELLENT control of fat-hen (*Chenopodium album*) in chou moellier has been obtained by pre-emergence spraying of TCA to a ridged chou moellier crop in Southland. In this article T. G. Sewell, Instructor in Agriculture, Department of Agriculture, Gore, discusses the method of spraying and the results obtained.

LAND lying along the Mataura River near Wendonside is infested with weed seed, and fat-hen is particularly troublesome. On the area under discussion the ground was worked and finally rolled and ridged with 2½lb. of seed in the first week in December. Two days after ridging the field was sprayed with TCA at 20lb. in 30 gallons of water per acre. To take full advantage of any rainfall, which is necessary to activate the TCA, this material should have been applied immediately the crop was sown.

At the time the photographs were taken, 7 weeks after treatment, there were no fat-hen seedlings in that part of the crop sprayed, but seedlings were very thick in a control strip left unsprayed. Scuffling was unnecessary on the sprayed area. The cost per acre for spraying was £3 5s.—£3 for material and 5s. for application.

At maturity there was little difference in crop weights, the yield in both the sprayed and unsprayed sections being approximately 26½ tons an acre. At this stage the surviving plants on the untreated area had thick stems whereas the treated area was more dense with thin stems more suitable for sheep feeding.

The farmer is well satisfied with the result, as no scuffling for weed control was necessary and there was no smothering of the seed ridged. He also considers that the prevention of reseeding during the time the chou moellier is in the ground will aid subsequent pasture establishment.

Unsprayed area, showing vigorous growth of fat-hen.

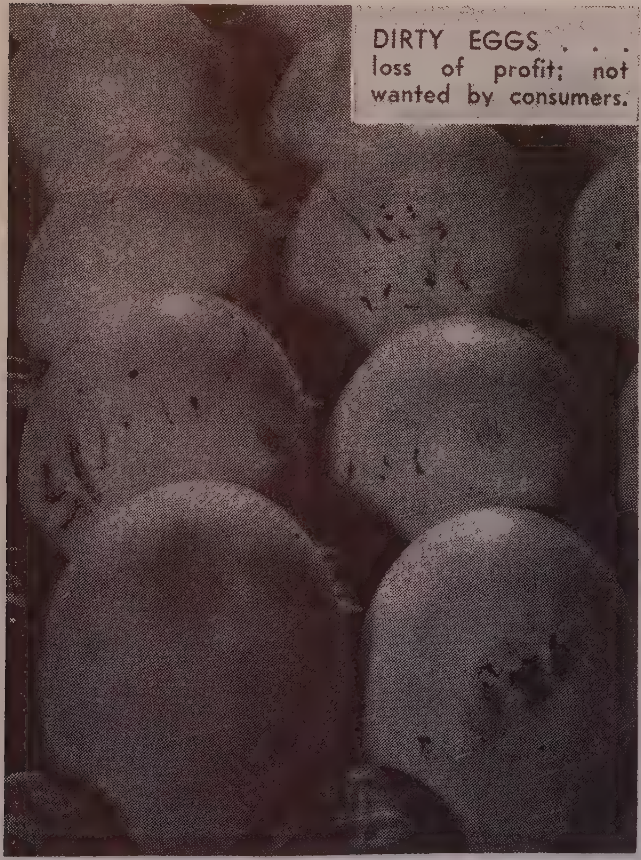
Dirty Eggs Can Substantially Reduce Producer's Profit

By J. EDMONDSON,

Poultry Experimentalist, Poultry Demonstration Plant, Department of Agriculture, Upper Hutt

CONSUMERS of shell eggs always watch quality closely. They are willing to pay a good price for what they consider to be fresh and attractive eggs of high interior quality. Stale-looking and dirty eggs are bought only if better ones are not available and then often under protest. Dirty eggs are unattractive and producers must expect to sell them at a discount. Over a period the loss in profits due to an excessive number of dirty eggs can add up to a considerable amount of money. The cost of cleaning them is high and their keeping quality is low. With the approach of winter care should be taken to prevent dirty eggs occurring and being sent to egg floors.

CLEAN EGGS . . . maximum price; attractive to consumers.



DIRTY EGGS . . . loss of profit; not wanted by consumers.

THE egg floor may also suffer financial loss because of the relatively rapid deterioration in the quality of dirty eggs, particularly where eggs are held for longer than a week. This rapid deterioration can also affect the consumer, as some of these eggs may spoil after purchase and before use. Such eggs will cause a rapid falling off in demand by the consumers affected, and the prosperity of the industry depends on the quantity of shell eggs bought by housewives. The problem of dirty eggs is without doubt one for the producer to solve. He is the one who will benefit most from clean eggs and will lose most in attempting to sell dirty eggs.

Almost Always Clean when Laid

Studies made by the Missouri Experimental Station and the United States Department of Agriculture show that 99 per cent. of all eggs are clean when laid. They become dirty or stained by contact with dirty, damp nesting material, dirt on the layers' feet or feathers, or by being packed in dirty containers, particularly if they are moved from a cold to a warm atmosphere, which causes sweating.

Attention to the following aspects of management will reduce the number of dirty eggs produced, thereby cutting down the time spent in cleaning eggs and also improving the quality of eggs available to the public.

1. Provide clean, dry floor litter: Hens are then less likely to carry manure on their feet to the nest. The litter should be at least 3in. deep and as it becomes dirty it should be stirred up to keep it loose and dry. Where

Photographs on this page by Green and Hahn.

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Ample clean nesting material is essential and three egg collections daily are necessary if eggs are to be kept clean.

necessary more litter should be added. Good ventilation in a house is important in keeping litter dry.

2. Provide clean, dry nesting material: Wet nesting material clings to eggs and stains them. Broken egg material in a nest sticks to the shell, carrying dirt with it, and is very difficult to remove. Dirty nesting material, even though perfectly dry, will adhere to eggs, which are moist when laid. Dirt and damp constitute ideal breeding conditions for bacteria and moulds, some of which by penetrating the shell seriously affect the interior quality of the egg.

3. Provide sufficient nesting space: The recognised ratio is 1 nest for every 4 or 5 layers or, if community nests are used, 1 sq. ft. of nesting space for 4 or 5 birds. As birds require seclusion when laying, it is an advantage to have the nests reasonably dark as a contribution to cleaner eggs. Birds should be prevented from sleeping in the nests at night by closing them.

4. Confine the layers: Hens running outside in wet, muddy conditions or when there is a heavy dew will carry mud and cause many eggs to be dirtied. Under such conditions it is better to keep them inside until most of the eggs have been laid.

5. Gather eggs at least three times a day: Frequent collection is essential in the production of clean eggs. The longer an egg remains in the nest the greater is the risk of its being stepped on, dirtied, or cracked by birds visiting the nest. The chances of its being continually warmed by later layers or by broody birds also increase. Such warming will cause the internal quality of the egg to deteriorate.

In brief, clean, dry, sanitary conditions for the birds and for the eggs combined with frequent gathering are the main management factors affecting the production of clean eggs.

Cleaning of Eggs

The number of dirty eggs coming in to the producer's egg room can be reduced considerably by good management and attention to detail, but a few will always need cleaning if a reasonable price is to be obtained for them. Though cleaning of such eggs is unavoidable, the method by which they are cleaned is of great importance. Unsatisfactory methods may result in the entry through the shell of bacteria which cause a deterioration of the internal qualities of eggs. Such deterioration may not be evident when eggs are handled at the egg floor, as the bacteria take a few days to develop. The first person to become aware that the egg is bad will be an indignant housewife.

Bacteria can get inside an egg very easily. Dry egg shells are a good protection against bacteria, but a wet shell is very susceptible to entry by these organisms. Therefore, washing, unless done carefully, can easily result in distributing the maximum number of bacteria under conditions most suited for their invasion through the egg shell.

Dry cleaning is efficient and is preferable when eggs are only slightly dirty, which the majority of dirty eggs collected will probably be. Hand buffing with an abrasive material such as emery paper or fine sandpaper stretched over a brush or soft buffer pad is a useful method of removing

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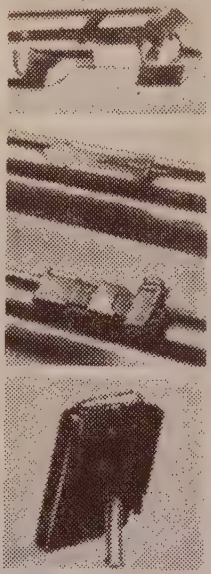
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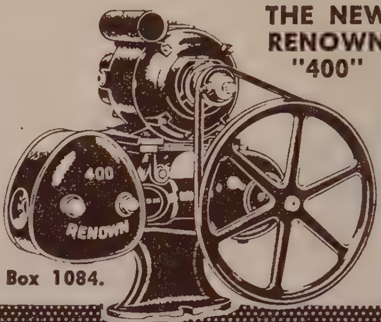

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small stains or dirt spots. Fine wire wool can also be used to good effect. The process can be speeded up by using a buffer operated by an electric motor.

Washing

Washing becomes necessary when eggs are too dirty to be handled by dry cleaning methods, but only dirty eggs should be washed, as eggs which are already clean should not be exposed to possible contamination. The question of when to wash is not very important, but it is usually easier and more practical to do so daily shortly after collection.

If warm eggs are washed in cold water, the contents of the egg will contract and draw bacteria and water into the egg. The washing water must therefore be warmer than the eggs; this will cause the egg contents to expand and the resultant pressure set up prevents bacteria or water from entering through the shell. The washing water **must be clean**, so it should be changed frequently. Failure to do so results in an abnormally high population of bacteria in the washing water, which then becomes a potent source of bacterial infection at a time when eggs are susceptible to infection.

Some producers are now adding detergents to the washing water to aid in the removal of dirt. Detergents improve the cleaning action, but an ordinary detergent has little or no effect as a germicide. Eggs washed in a detergent solution will keep no better than those washed in plain water. However, there are now several products on the market which combine a non-poisonous germicide with a detergent. They are combination cleaners and destroyers of bacteria and are commonly used for food and dairy equipment. Several of these can be used for the washing of eggs by hand or in egg-washing machines, thereby reducing the chance of bacteria-spoilt eggs.

In studies at Ohio Agricultural Experimental Station eggs washed in plain water showed 11.4 per cent. spoilage compared with 15.3 per cent. when washed in a detergent. Only 5.5 per cent. spoilage occurred when a detergent germicide compound was used. Such compounds are not a cure-all for the problem of washing eggs and the effect on egg quality, but they can help.

Eggs that have been washed must be dried quickly and thoroughly or the interior keeping quality will suffer. Bacteria can penetrate the shell easily when it is wet; and when the egg is cooling it shrinks internally and tends to pull material from the shell surface into the egg. A wire tray is useful for drying eggs on, particularly with an electric fan to speed up drying.

All eggs that are cleaned by washing should be packed in separate egg boxes and not in boxes containing naturally clean eggs.

Eggs that have been washed should be marketed with as little delay as possible. If they are sent to an egg floor clearly marked as washed eggs, the manager, knowing that they are more perishable than unwashed eggs, will pass them through quickly.

Lack of attention to detail in washing procedure can seriously affect quality. Very high standards of cleanliness must be observed. Much more effort is required to clean eggs than is needed to produce clean eggs and so obviate washing.

Poor eggs must be kept off the market if demand is to be increased, but even producers who do not consider the future of the industry should guard carefully the quality of their eggs, as too many second-quality and reject eggs can soon lead to loss of income.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given during July as follows:—

1XH Hamilton, 12.33 p.m.

9 July—"Calf Rearing", by L. P. Wells, Livestock Instructor, Department of Agriculture, Hamilton.

16 July—"Review of Experimental Work", by H. M. Bull, Instructor in Agriculture, Department of Agriculture, Hamilton.

23 July—"Advance the Dairy Industry", by W. Petersen, Federated Farmers, Hamilton.

30 July—"Copper Requirements of Peat Lands", by F. Van der Elst, Research Officer, Soil Research Station, Rukuhia.

1YZ Rotorua, 7.15 p.m.

5 July—"Pasture Management in Spring", by G. A. Blake, Instructor in Agriculture, Department of Agriculture, Matamata.

19 July—"Review of the Incidence of Feed Flavour in Butter, 1955-56 Season", by G. Purvis, Superintendent of Butter Instruction, Department of Agriculture, Hamilton.

25 July—"Cropping for Pigs", by S. W. Rees, Supervisor, Bay of Plenty District Pig Council.

2YZ Napier, 7.10 p.m.

3 July—"Results of Potato Trials in Hawke's Bay", by A. J. Coughlan, Fields Instructor, Department of Agriculture, Hastings.

17 July—"Rearing and Feeding of Chickens", by H. K. Mullins, Poultry Instructor, Department of Agriculture, Hastings.

31 July—"Results of Crop Trials in Hawke's Bay", by A. J. Coughlan, Fields Instructor, Department of Agriculture, Hastings.

2ZA Wanganui, 8 p.m.

5 July—"For the Country Woman", by Mary Macdonald.

12 July—"The Radio Vet.", by S. Jamieson, Veterinarian, Department of Agriculture, Wanganui.

19 July—"Certain Specific Diseases among Pigs", by C. M. Bailey, Supervisor, Taranaki District Pig Council.

26 July—"The Use of Nitrogenous Fertilisers", by A. A. Duncan, Instructor in Agriculture, Department of Agriculture, Wanganui.

3YA Christchurch, 12.20 p.m.

2 July—"Winter Orchard Work", by J. Coombe, Horticultural Instructor, Department of Agriculture, Christchurch.

16 July—Review of "Journal of Agriculture", by E. G. Smith, Instructor in Agriculture, Department of Agriculture, Rangiora.

4YA Dunedin, 12.30 p.m.

3 July—"Effect of Weedicides in Lamb Thrift", by K. H. C. Lewis, Invermay Research Station, Mosgiel.

10 July—"The Honey Bee", by I. W. Forster, Apiary Instructor, Department of Agriculture, Oamaru.

17 July—"Results of Trials in the Dunedin District", by S. M. J. Stockdill, Fields Instructor, Department of Agriculture, Dunedin.

24 July—"Co-ordination of High-country Investigations", by J. M. Hercus, Instructor in Agriculture, Department of Agriculture, Alexandra.

31 July—"Metabolic Diseases of Dairy Cattle", by J. A. Milne, Veterinarian, Department of Agriculture, Dunedin.

Regular Sessions

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8.5 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, 7.45 p.m., and Saturdays at 6 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month), Thursdays at 12.33 p.m. and 7.15 p.m. (fortnightly).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Tuesdays at 12.33 p.m., Wednesdays at 7 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 7 p.m.

History of Seed Wheat Certification in New Zealand

By J. A. S. MILLER,

Seed Certification Officer, Department of Agriculture, Wellington

THAT the desirability of having a source of seed wheat of high purity and relative freedom from seed-borne diseases has long been recognised is illustrated in the following article, which traces the development of the New Zealand Department of Agriculture's seed wheat certification scheme from its conception in the early 1900s by the late Dr. F. W. Hilgendorf at Canterbury Agricultural College to the present highly efficient system.

THE first attempt to introduce a scheme to provide seed wheat of reasonable varietal purity was made in 1915.

Work of Canterbury Agricultural College

Dr. Hilgendorf recorded in 1918 the procedure that had been adopted for the distribution of Hunters or Red Chaff seed wheat purified by Canterbury Agricultural College. This line had been in the process of purification since 1910. The variety was sold as College Hunters in lots of 10 bushels or more at a price of about 1s. per bushel in excess of that obtained for milling wheat.

The demand greatly exceeded the supply and it was soon realised that if anything was to be done to maintain the standard, more pure seed would have to be produced than was available from the College farm. Accordingly, it was decided to attempt the formation of a seed growers' association to foster the extension of the work. The members of the association were entitled to procure a stock of pure seed from the College or from any other source.

The College by this time was producing pure seed of the following varieties: College Hunters, College Solid Straw Tuscan, College Purple Straw Tuscan, and College Pearl. Members of the association were to sow this pure seed on their own farms. The lines were to be kept reasonably pure by the farmer's rogueing a block of 1 or 2 acres of the standing crop before harvest. The produce of this block was to be saved to provide the farmer's own requirements for the following season, the produce of the balance of the area being threshed first to clean the mill. In subsequent seasons a similar procedure was to be adopted.

To maintain a reasonable standard it was decided that it would be necessary for crops to be inspected in the field and for successful growers to be issued with some form of certificate to identify the produce of their areas. Dr. Hilgendorf was appointed honorary inspector to the association, and his travelling expenses were defrayed by an annual grant of £100 per year by the Department of Agriculture. This sum was more than adequate for the purpose.

Members telegraphed the inspector when their crops were ready and he examined them for varietal purity. If the crops passed the field inspection, the growers were issued with specially printed tickets which were sewn into the sacks of seed after harvest. The number of tickets issued to each grower was based on an estimate of the yield of each crop. About two-thirds of the crops inspected were passed. After inspecting all the crops offered, the inspector advertised in local newspapers the names and addresses of growers having certified seed wheat for sale. Buyers and sellers made their own arrangements about price, but it was usually 1s. above the milling price.

Membership of the association never exceeded nine, and the only grower to work up his own strain was Mr. H. M. Anderson, of Waikari, who selected a line of White Straw Tuscan. All other nucleus material came from the College.

In the last season which Dr. Hilgendorf records (1918) the supply of certified seed greatly exceeded the demand and many hundreds of bushels were left in the hands of the growers.

Department of Agriculture's Part

The work of Dr. Hilgendorf and the Canterbury Seed Growers' Association became too extensive to be handled

Dr. F. W. Hilgendorf introduced a form of seed wheat certification at Canterbury Agricultural College in 1915 and in 1918 recorded the procedure that had been adopted for the distribution of Hunters or Red Chaff seed wheat purified at the College.

by private and voluntary effort, and the Department of Agriculture in 1920 undertook to maintain and distribute purified lines, which by that time included the variety Velvet, which had been selected by Mr. J. McCulloch, of Ngapara.

Farmers who were known to have obtained pure seed were written to and invited to assist in keeping it pure. An officer of the Department inspected the crops of those farmers who were willing to participate in the scheme. Only the best available crops were selected from among those offered and, subject to the farmers concerned retaining sufficient seed for further multiplication, the Department agreed to purchase the produce from these crops. At harvest time the same officer inspected the mill before each selected crop was threshed to see that it had been thoroughly cleaned and then branded the sacks as they came from the mill.

In the 1920-21 season approximately 10,000 bushels of certified seed wheat were available for sale.

The following price list for this seed may be of interest:—

	Per bushel*	
	s.	d.
Solid Straw Tuscan ..	9	10½
White Straw Tuscan ..	9	10½
College Hunters	10	1½
Velvet	10	4½
Pearl	10	4½

* Free on rail, sacks extra.

This scheme apparently lapsed, as the "Journal" for January 1924 carried a small paragraph indicating that the Department of Agriculture had arranged for the inspection of wheat crops of those farmers who had purchased pure seed from Canterbury Agricultural College. Farmers whose crops on inspection were found to be free from foreign varieties were to be given a certificate to that effect.

This attempt at certification apparently failed, as no further mention is made of a seed wheat certification scheme until 1928, when J. W. Hadfield, of the Department of Agriculture, outlined a system introduced in the 1927-28 season.

Wheat Research Committee Formed

The scheme outlined in the April 1928 "Journal" has continued with modifications until the present. The Department co-operated with the newly formed Wheat Research Committee, which was concerned with the breeding and selection of improved varieties.

In the first season (1927-28) during which the scheme operated applications for certification were restricted to crops grown by Canterbury Agricultural College and to crops grown by farmers from seed supplied by the College in the 1926-27 season. The produce of the College crops reaching the required standard was classified as "Pedigree seed" and after machine dressing was identified by a red label. The produce of farmers' crops was classified as "farmer's certified seed" and after machine dressing was identified by a white label.

Growers whose crops passed the official field inspection were requested to sign a guarantee to have the mill thoroughly cleaned down and to keep separate the first three and the last three sacks threshed.

After threshing was completed the seed wheat was officially sampled, graded by the wheat grader employed by the Wheat Research Committee, and passed or rejected according to the grader's report. Accepted lines were machine dressed under supervision and the sacks tagged and sealed.

The Department of Agriculture undertook to purchase certified seed in quantities sufficient to fill orders on hand from merchants. Seed was purchased at a uniform price of 6d. per bushel above the ruling price of milling-quality wheat as at 31 March. Under this scheme 97 acres of Solid Straw Tuscan, 250 acres of Hunters, and 126 acres of Velvet were entered for certification. Of these areas, 97 acres of Solid Straw Tuscan and 118 acres of Hunters passed the official field inspection. All the Velvet crops were rejected.

[*Weigel*

In 1927 J. W. Hadfield introduced the seed wheat certification scheme which has developed into the present efficient system.

Tardy Response from Growers

It was recorded that though the response to this scheme from merchants was most encouraging, growers responded very tardily, owing possibly to the fact that the 6d. per bushel premium did not sufficiently compensate growers, as a lower price generally ruled at the date (31 March) selected for purchase from farmers.

The scheme involving the purchase of certified seed wheat by the Department of Agriculture continued until the 1930-31 season, when this procedure was abandoned in favour of a scheme whereby samples and full details of every certified line were distributed among interested merchants. In this scheme the amount of seed certified in each variety was limited to sufficient to meet the probable demand.

This season also brought the introduction of the system wherein a qualification for certification was the sowing of certified seed. There was by now only one class of seed wheat, "certified seed". A minimum standard of varietal purity and freedom from loose and stinking smuts (99.8 per cent. each) was necessary before a crop could be accepted for certifica-

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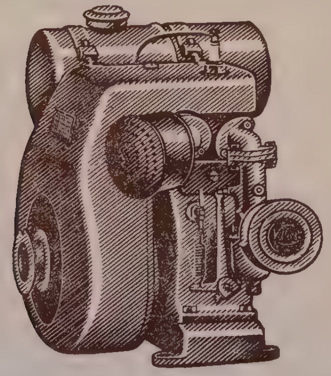

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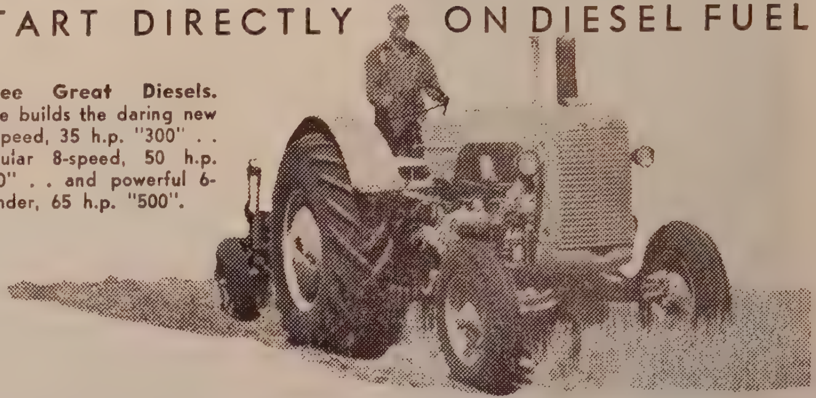

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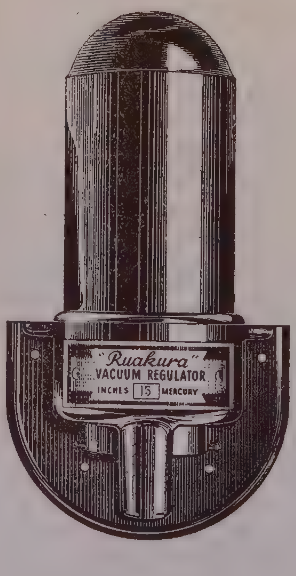

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An early wheat harvesting scene in Canterbury, which has always been the leading wheat producing area of New Zealand and where seed wheat certification was begun.

tion, and this resulted in heavy rejections at field inspection. Lines found to be free from smut at field inspection were distinguished at machine dressing by the application of "smut free" stickers to the insert slips placed in the sacks.

During the seasons 1931-32 to 1935-36 inclusive the College declined to enter its wheat crops for certification, but the Department continued to accept for certification farmers' crops sown with seed produced by the College during this period.

Effects of Second World War

Apart from a few minor modifications the scheme continued unchanged until the outbreak of the Second World War, when it was decided to restrict its scope to conserve effort.

In the 1939-40 season certification was confined to nucleus areas of standard or new varieties and to areas sown with seed from these nucleus areas. This limited very seriously the amount of seed certified, and in the 1940-41 season it was decided to extend the scope of the scheme to bring in areas one step further removed from the nucleus stage so that a reasonable quantity of certified seed would be available. The general effect was that all certified seed was only once or twice removed from selected and hot-water-treated material, a very desirable state of affairs. (Hot-water treatment of all nucleus material is done under the supervision of the Department and is the standard method for the control of loose smut in wheat.)

Three Certified Classes Introduced

In 1946 the scheme was again modified to provide for a further stage of multiplication to be made under certification and for three certification classes, Pedigree, Mother, and Standard. This step brought the scheme into the general lines of that for grasses and clovers. Under this scheme the seed used for the sowing of areas eligible to produce certified Pedigree seed has been obtained by reselection and has been hot-water treated so that all seed certified would be no more than three stages removed from treatment.

An arrangement was at the same time made with the various grain, seed, and produce merchants' associations whereby the certified Pedigree seed wheat is produced under Departmental supervision and is distributed to a nominee of each association according to the demands of the particular district for the variety under consideration. These nominees are expected to multiply the allocation of certified Pedigree seed under certification and to distribute the certified Mother seed so produced among all members of the association for supply to farmers. Mother seed is used to sow areas which in turn produce certified Standard seed.

Purity and Germination Tests

Since the 1947-48 season official samples of certified seed wheat have been drawn for purity and germination tests and certificates of analysis issued to the owners of the seed.

Table 1, showing acreages inspected and passed for certification, reflects the various changes which have been made in the certification procedure.

Of particular interest is the relatively low proportion of areas passed in the earlier years, when eligibility was based on the sowing of any line of certified seed, compared with the

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TABLE 1—ACREAGES INSPECTED AND PASSED

Season	Acreage inspected	Acreage passed
1927-28	347	216
1928-29	1,856	700
1929-30	2,277	736
*1930-31	3,289	385
1931-32	1,063	810
1932-33	1,873	N.A.
1933-34	2,937	1,109
1934-35	2,545	1,334
1935-36	5,538	3,161
1936-37	7,924	4,887
1937-38	5,290	3,087
1938-39	5,524	3,783
1939-40	10,178	6,398
†1940-41	1,705	1,662
‡1941-42	2,611	2,461
1942-43	3,527	3,410
1943-44	2,708	2,648
1944-45	3,371	3,335
1945-46	1,833	1,833
§1946-47	8,601	7,988
1947-48	8,703	8,052
1948-49	8,176	7,159
1949-50	5,809	5,581
1950-51	7,080	6,515
1951-52	7,188	6,146
1952-53	6,204	5,866
1953-54	4,872	4,801

* Change in standard of field inspection.
† Wartime restriction introduced.
‡ Wartime restriction eased.
§ Introduction of three classes.

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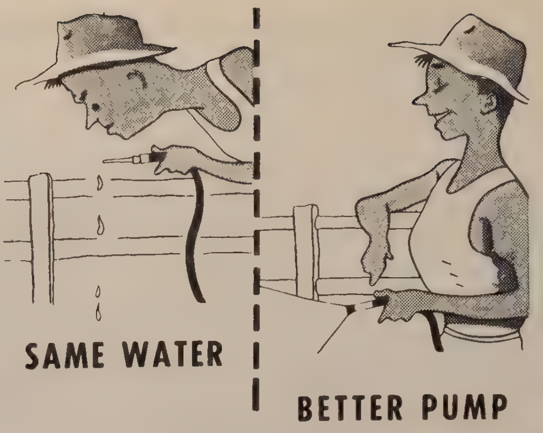
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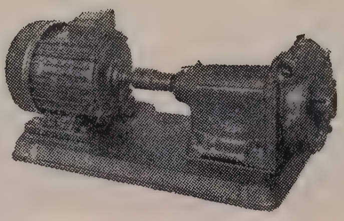

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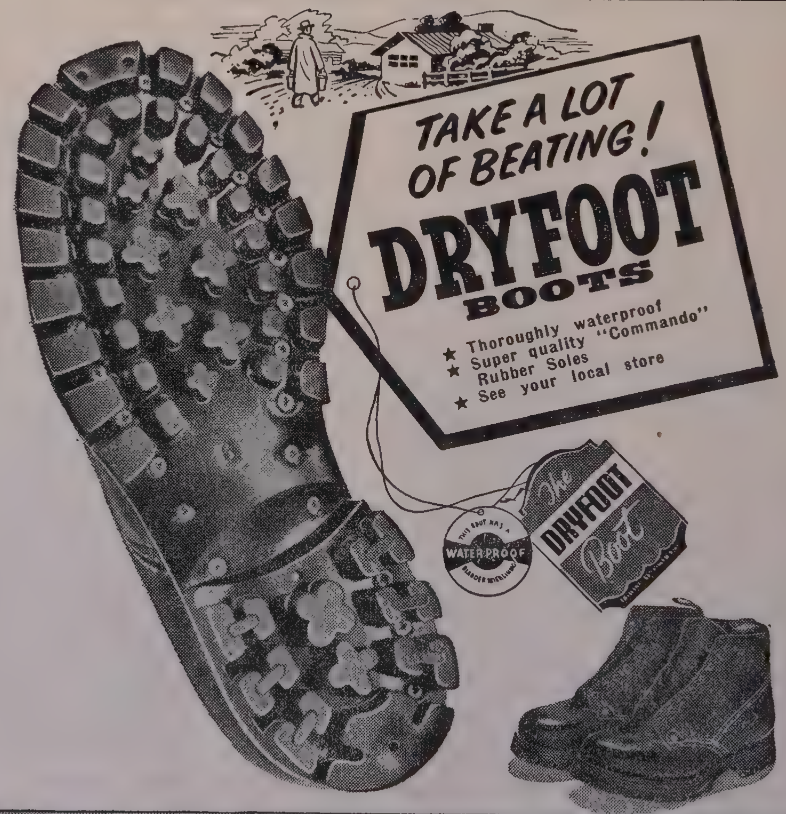
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TABLE 2—VARIETIES AND QUANTITIES OF SEED CERTIFIED (in bushels)

Season	Totals*	Solid Straw Tuscan	Dreadnought	College Hunters	Marquis	Hunters II	Cross 7	Jumbuck	Tainui	Fife Tuscan	Hilgendorf	Yielder
1927-28	3,840	N.A.	—	N.A.	—	—	—	—	—	—	—	—
1928-29	11,682	N.A.	—	N.A.	—	—	—	—	—	—	—	—
1929-30	16,161	11,006	220	4,106	400	—	—	—	—	—	—	—
1930-31	4,056	1,540	633	98	650	—	—	—	—	—	—	—
1931-32	1,283	N.A.	N.A.	N.A.	N.A.	N.A.	—	—	—	—	—	—
1932-33	7,001	N.A.	N.A.	N.A.	N.A.	N.A.	—	—	—	—	—	—
1933-34	5,554	3,132	191	—	246	1,985	—	—	—	—	—	—
1934-35	11,110	4,365	1,921	—	87	2,424	2,313	—	—	—	—	—
1935-36	25,646	5,972	5,202	—	—	3,843	10,512	117	—	—	—	—
1936-37	47,437	10,285	7,377	—	—	7,107	21,339	1,329	—	—	—	—
1937-38	44,300	9,092	4,319	—	—	7,087	19,120	4,494	61	—	—	—
1938-39	59,619	12,319	7,881	319	—	10,204	22,798	3,975	1,230	—	—	—
1939-40	72,450	13,333	6,978	2,018	2,704	8,680	33,625	46	2,835	533	—	—
1940-41	29,438	1,668	8,202	1,628	—	3,203	8,416	11	16	5,761	—	—
1941-42	29,740	1,940	5,556	4,367	—	140	9,207	23	613	7,864	—	—
1942-43	48,384	615	7,238	3,627	—	489	25,595	204	—	10,616	—	—
1943-44	30,158	—	7,121	—	—	59	20,764	—	—	2,214	—	—
1944-45	25,690	—	8,147	—	—	—	16,337	—	—	1,206	—	—
1945-46	44,029	459	4,702	—	315	—	34,512	—	—	4,041	—	—
1946-47	97,960	2,361	10,105	—	473	228	68,339	10	33	16,411	—	—
1947-48	109,560	699	12,693	1,682	31	330	85,799	—	270	8,056	—	—
1948-49	110,729	1,584	8,770	2,475	56	459	85,915	45	42	4,725	6,654	4
1949-50	116,055	515	10,937	524	61	483	93,488	18	2,424	4,479	3,126	—
1950-51	91,377	1,790	7,348	819	212	633	65,922	174	929	5,266	8,135	149
1951-52	101,668	—	7,170	472	149	—	80,693	148	572	4,802	1,578	6,084
1952-53	80,421	—	7,951	1,081	—	—	53,662	—	1,050	3,541	4,235	8,901
1953-54	111,616	—	11,442	267	121	—	79,087	—	1,699	4,726	5,444	8,830

N.A. Not available.

* Included in these totals are small quantities representing varieties the economic worth of which was too small for them to be included in the table. These varieties, which have since disappeared from commerce, were Garnet, Solid Straw Velvet, Yeoman, Velvet, Sensation, Bencubbin, Taiaroa, Montana King, and Holdfast, the first four appearing briefly in the early 1930s and the last five in the early 1940s.

very high proportion when entry was restricted to those areas sown with seed of known close removal from reselection and hot-water treatment.

Of even more interest, though not revealed in the table, is the fact that in recent years the majority of the rejections have been caused by some factor other than the seed sown.

Rejections have generally been brought about by an excess of oats, or barley, or weeds, the removal of which by machine dressing would be impracticable. It is indeed most unusual to find any area showing the presence of smutted heads or heads of another variety in numbers anywhere approaching the tolerance permitted.

The present certification scheme involves the determination and maintenance of varietal purity and freedom from seed-borne diseases by a knowledge of the origin of the seed sown in the area, the inspection of the standing crop, the paddock branding of the produce of the area, the machine dressing of it under supervision, and the drawing of a sample for the official purity and germination test.

Though this scheme is considerably more involved than that envisaged by Dr. Hilgendorf, its purpose remains the same; that is, the maintenance of a supply of seed wheat of the highest quality.

Table 2, showing the quantity of each variety certified each season, gives an interesting picture of the change in the wheat varieties grown in New Zealand during 25 years.

☆

Protecting the Quality of N.Z. Dairy Produce

TO the manager of a dairy factory poor-quality milk or cream is a serious problem. Ability to manufacture consistently a top-grade product depends largely on having supplies of pure milk or cream, and if the factory is given good-quality raw material, the processing of it is a relatively easy matter. The farmer whose supply does not stand up to factory grading is immediately penalised by receiving a lower price for his product.

The dairy farmer must produce clean milk and cream if his factory is to manufacture dairy produce which will return a high price. Yet in spite of care and attention the farmer knows well that his supply can suddenly drop in quality. The good dairy farmer who maintains a high standard of milking shed hygiene can still sometimes be unaware of the causes of poor quality.

Protecting the quality of supplies arriving at dairy factories is the work of Farm Dairy Instructors of the Department of Agriculture. Their principal duty is to inspect the dairies and milking machinery at farms where poor-quality milk or cream is produced and to help farmers take the steps needed to improve supplies.

In this work the Instructor usually has the full support of the farmer, who appreciates that the expense and work involved are a small consideration in comparison with the losses caused if nothing is done. In "coat-off" instruction with the farmer the Farm Dairy Instructor will go through everything connected with the production of milk or cream until a solution of the poor-quality supply is found. Testing and cleaning of milking machinery, separators, coolers, cans, and water supply are part of the Instructor's job.

Dairy Factory Experience

Farm Dairy Instructors have been employed in dairy factories before joining the Department and have a good knowledge of dairy, farm, and factory practices. While in the Department they are kept up to date on any new developments and have behind them the Dairy Instructors and Graders and the resources of the Department's Dairy Division Bacteriologists and Chemists if they are needed.

This group of 87 Instructors play a large part in ensuring the quality of New Zealand dairy produce and enjoy generally the confidence of farmers and factory managers.

From time to time there are vacancies in the instruction staff, and anyone with dairy factory experience interested in this type of work should get in touch with the local Dairy Instructor or Grader or the Director, Dairy Division, Department of Agriculture, P.O. Box 2298, Wellington.

◆

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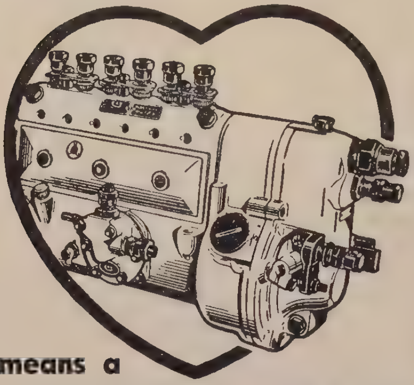

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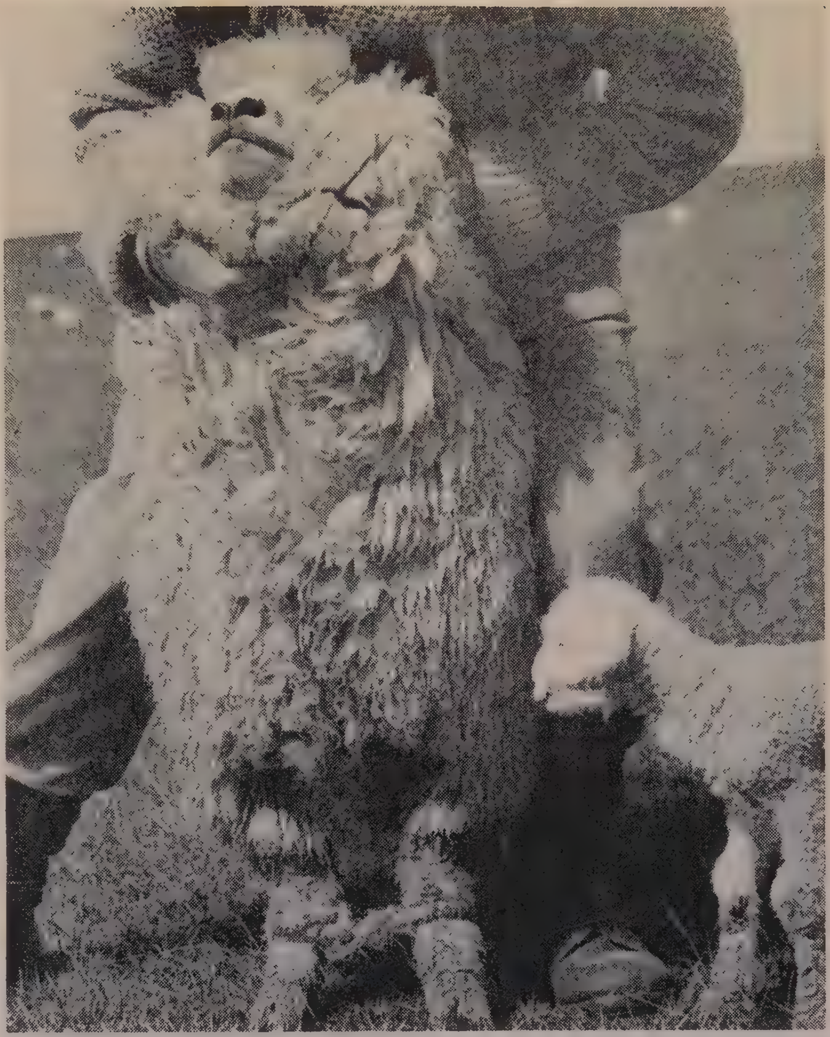
Mothering up of Lambs

WITH lambing operations inevitably come orphan lambs, ewes which have lost lambs, and ewes which cannot mother them. The mothering up of lambs can be an exasperating task at a time when the shepherd is very busy. In this article C. A. Martin, Livestock Instructor, Department of Agriculture, Tapanui, tells of some of the mothering-up methods adopted by sheep farmers of West Otago to make a ewe "take" a lamb quickly and permanently.



▲ A 2-tooth ewe with her forelegs tied closely together, thus hobbling her and preventing her leaving the lamb.

THE aim should be to have every ewe in the flock a good potential mother, and farmers can best assure this by culling every defective ewe. Good shepherding naturally leads to less mothering up being necessary. A good shepherd moves quietly among his ewes when they are lambing; he knows when assistance is needed, and, having given it, knows to move away quietly and quickly when the lamb is delivered and given to the ewe and any necessary treatment has been administered.

The following seemingly minor points can save lambs and ewes, and anything that does that leads to less mothering up and is, therefore, worth while. When a live lamb has to be taken away from a ewe manually the natural thing to do is to place it beside the ewe's head so that she can smell it and lick it clean. The lamb should be placed with its belly and fresh navel cord away from the ewe's head. Lambs have been lost through the ewe sucking the fresh navel cord with the result that a serious rupture occurs, and this is encouraged by placing the belly of the lamb against the ewe's nose.

▼ A ewe and lamb in a mothering-up pen.

On hilly or undulating country a ewe which has required assistance should be left lying with head downhill slightly; such a position can prevent a case of bearing trouble or even a prolapsed uterus. Penicillin 500 is packed so that it can be conveniently carried; it is easily used, and should be injected into the thigh muscle of all ewes that have had a difficult

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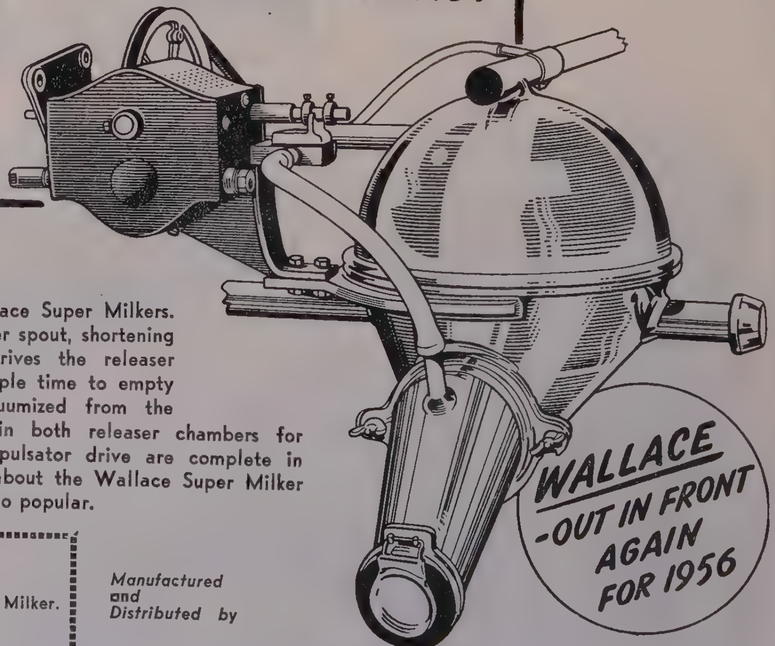

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lambing, particularly those that have had to be handled.

Preventing Ewes' Leaving Lambs

Two-tooth ewes are often timid and and do not take their lambs readily, but run away from them. The hobbling of 2-tooths by tying their forelegs about 5in. apart has been found a great help in these cases. When hobbled the ewe cannot run away from her lamb, and when she attempts to move she goes down on her knees, leaving her udder and teats readily available for her lamb. Similar hobbling can be used to good advantage in persistent cases of bearing trouble, as it tends to keep the pressure off the rear end of affected ewes.

Mothering up

Despite good shepherding and good management, it is still necessary to mother up many lambs. When a good ewe gives birth naturally, or with assistance, to a dead lamb she remains a good potential mother, and on every farm a lamb can usually be found for her. This lamb can be one whose mother has died, one whose mother is incapable of rearing it, or one of twins the mother of which has not sufficient milk for two lambs. Many farmers mother up by tying the ewe by a front leg, skinning her dead lamb, placing the skin on the lamb to be mothered, and leaving them together. In the great majority of cases the ewe soon takes the lamb.

This method is a good one, but there are disadvantages and dangers which should be known. The skin of a dead lamb should never be used if the lamb died of blood poisoning, tetanus, or any infectious disease, and any skin should be left on as short a time as possible.

The danger of tying a ewe with too long a rope and allowing her too much movement is illustrated by the lamb lying crushed under the ewe. Also, on dirty ground such as that shown there is grave risk of infection for a ewe and newly born lamb.

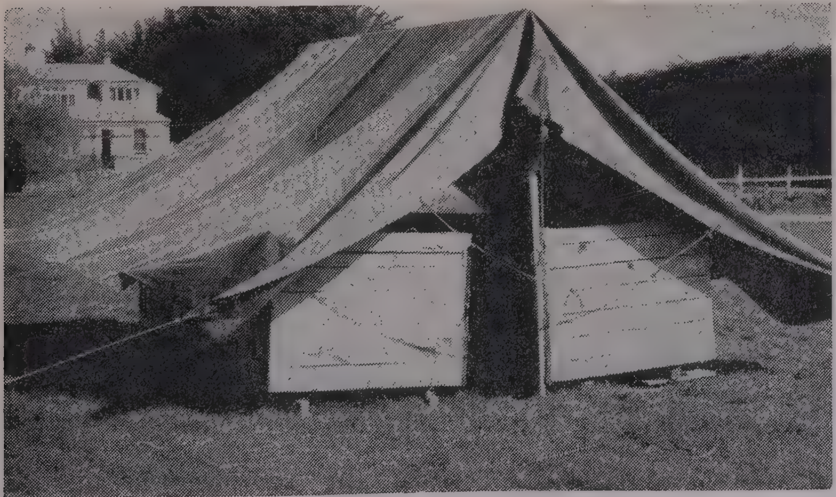
The length of the rope securing the ewe is important—3ft. is ample, as any more allows the ewe too much movement and could lead to a broken foreleg and other injuries both to the ewe and lamb. If a ewe is to be tied up, she should always be tied in a clean place and not under trees or alongside a hedge. On many farms lambing equipment includes 18in. long iron pegs with swivelling loops on their tops to which is attached about 3ft. of light rope. These are ideal for this manner of mothering, as a ewe can be secured on a clean spot where she is found, and a lamb can be taken to her there. If they dirty the area around the peg, it is easy to move them. Ewes can also be tied around the necks, but this can be dangerous, and it is easy for woolly ewes to slip their collars.

Mothering-up Pens

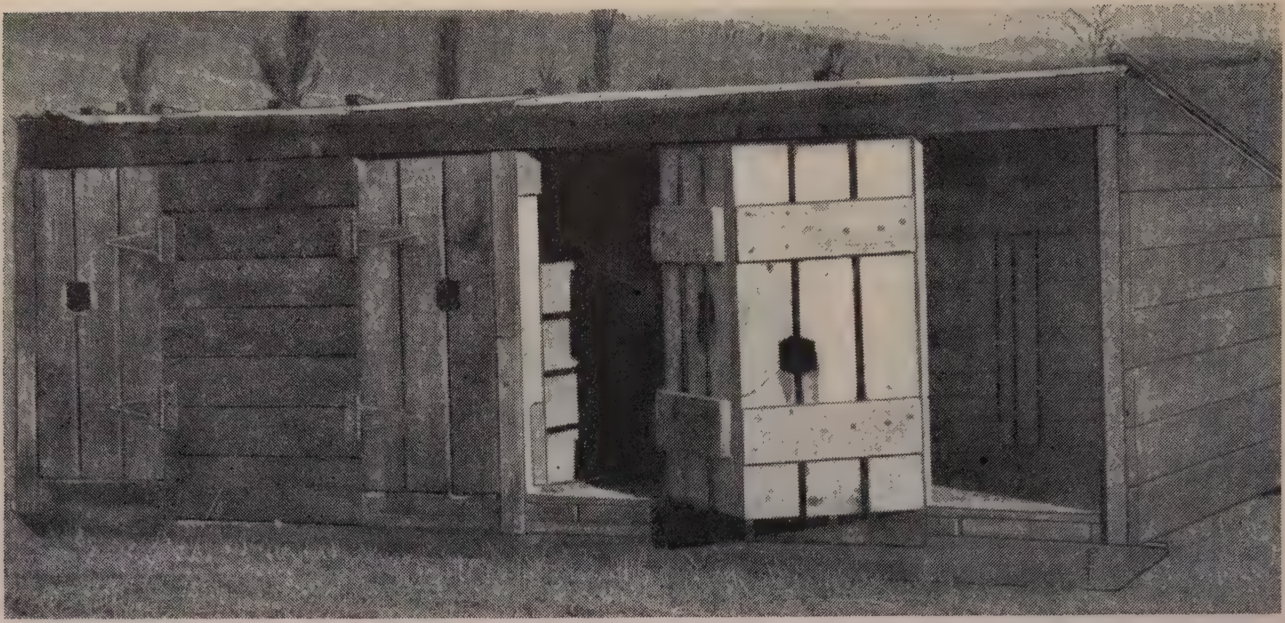
The mechanical age is having an effect on lambing operations. The shepherd who once did his rounds on horseback now on many farms rides around in a truck or on a light tractor. On these properties this mechanisation has led to increased efficiency in that the farmers can now move about lambing paddocks more than previously. This is important, as these properties are now carrying more sheep than ever before.

These conveyances have built on their trays, or they pull behind them on sledges, what could be called sheep conveying pens. They comprise one pen in which ewes without lambs can be put, and another, smaller compartment in which motherless lambs are carried. Ewes and lambs are then transported to mothering-up pens.

In West Otago it is common to see these mothering-up pens studded around the lambing paddocks. A typical pen is one made with four 4ft. hurdles laced together at each corner and with manure bags tacked

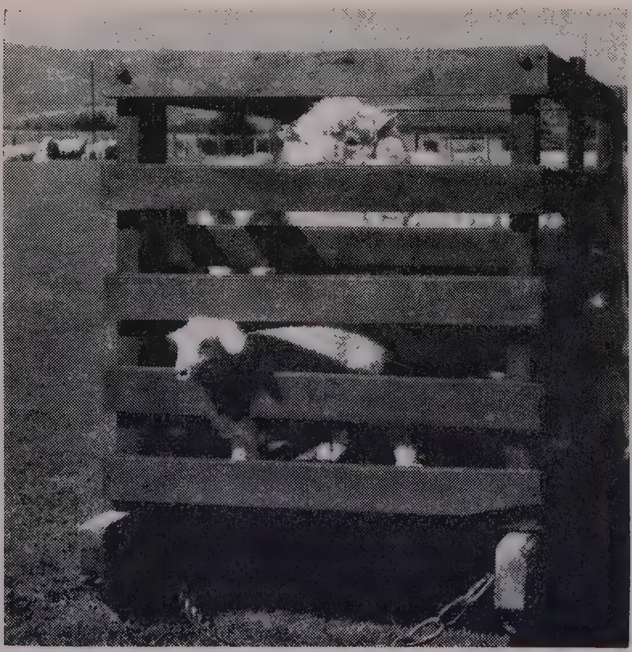


A number of mothering-up pens covered by a canvas awning for protection against sunshine and storm.



Lambing pens with four compartments on skids. Movable partitions enable two larger compartments to be formed.

around the four walls. The ewe and her foster lamb are placed in this pen, which is small. The bags prevent the ewe from seeing out and therefore being distracted; all she has to interest her is the lamb, and experience proves that very soon she is mothering it. It has not been necessary to skin a dead lamb, and there has not been so great a risk of ewe or lamb injury with this method.



A small sledge on which is built a large pen for carrying ewes and a small compartment for lambs.

Double or treble lambing pen units can be made by using 8ft. or 12ft. hurdles and subdividing the pen into 4ft. x 4ft. cubicles with 4ft. hurdles. Specially made circular pens 4ft. in diameter have been made of corrugated iron and have proved very effective, though this type should be made stable by pegging them into the ground. The advantage of these pens with open bottoms is that they can be easily moved to clean ground regularly. Their size also means that they can be readily covered in rough, cold weather.

A series of roofed pens on skids is often used as mothering-up pens. These pens are simply a small building containing perhaps six 5ft. x 3ft. pens. Each pen is approximately 4ft. high, has its own door, and usually has a small bail in it so that the ewe can be restrained if necessary. These pens also have proved very efficient, but cannot be wholly recommended because of the risk of infection. A ewe which has lost her lamb may be infected, but has been saved by the use of penicillin or something similar. If confined to a pen, she could still contaminate it, and so the infected pen could become a source of danger to other ewes and lambs. When these pens are used their floors should be covered liberally with hay, which should be cleaned out and burnt regularly and the floors thoroughly disinfected. The same applies to the floor of any truck or sledge used for carrying ewes and lambs during lambing. A special sledge should be used for the transport of carcasses of sheep which have died and it should be used for nothing else.

It is impossible to state the time that should be taken for the mothering up of any lamb. Every case is different and should be treated on its merits, but it is important that the ewe and lamb should not be released until it is certain that the ewe has taken the lamb or is well on the way to taking it.

Wherever ewes are lambing there will always be lambs to mother up. This work can never be eliminated, but by improved technique on many farms it can be greatly reduced, and a job which has always been irksome can be made more pleasant.

Garden Planning

MOST homes being built today have interiors planned for comfort and convenience, but a large proportion of them have been set down on their sections with little thought to siting in relation to the future layout of the garden. The latter may be given a little hasty consideration immediately after the builders have left, but as a rule lawns are sown and plants set out with no prepared over-all plan and little regard to the ultimate general effect. In this article, which is the first of three on this subject, J. S. Say, Horticulturist, Department of Agriculture, Auckland, discusses some of the points which should be considered before any planning is done, and next month examples of the practical application of these will be described. The section on routine garden work for July is by Elspeth Gray, Horticultural Instructor, Department of Agriculture, Auckland.

LANDSCAPE gardening is popularly regarded as something that applies to large gardens, both public and private, but does not concern the average home owner with a section of $\frac{1}{4}$ acre or smaller. The reasons for this very mistaken idea are numerous and not hard to find. The term "landscaping" itself is rather unfortunate, for it conjures up visions of large areas, but if "garden design" or "garden planning" is substituted, the subject is put into truer perspective.

Many excellent and beautifully illustrated books on garden design have been published during the last few years, but as a rule they deal with larger gardens and conditions very different from those confronting the average New Zealand home owner. The technical language of many landscape architects and the photographs of contemporary gardens, which often contain few plants and bear little resemblance to the popular conception of a garden, have tended to make many think that garden planning is something completely outside the realm of practical home gardening.

Good planning is as important, and in some ways more difficult, on a small section as on a large one, for the small section has to be planned as a unit with the house and the various parts of the garden all in harmony without any sense of distortion or cramping. The aim is to give an air of spaciousness and the problem of what to exclude often becomes more difficult than what to include. Many older well-kept gardens achieve a friendly relationship with the house, but often only after a great deal of trial and error, much of which could have been avoided if a plan had been decided on in the first place.

Before any attempt is made to plan the house and garden important factors influencing the design should be considered. Some of these may not be obvious at first, but once their importance is realised it may mean that

HEADING PHOTOGRAPH: A delightful spot for outdoor living in a comparatively new garden where full advantage has been taken of established trees both in the garden itself and in adjoining properties. The trees and shrubs form a background to the mixed flower border being planted on the right.

faults which make themselves painfully evident as time goes on will be avoided. Most of the following points have a direct bearing on the choice of the site and the design of the garden and should be considered when the house is being planned or in relationship to an existing house.

The Site

The site may include locality, position within the locality, and the general physical characteristics of the section.

For most home builders or buyers the choice of locality is rather limited for reasons such as cost and nearness to work, but there is often some choice within the locality. A number of points should be considered with the house plan and the future development of the section in mind. Main roads carrying heavy traffic are better avoided if possible because of the danger to children and the noise and dust. Right-of-way sections are usually quiet, but often need careful planting to screen the neighbouring properties and give reasonable privacy. Corner sections often have better views and do not give the house and garden a cramped appearance, but they are generally more difficult to plan for utility as well as beauty. Planning is often more difficult on sections of irregular and awkward shapes, but they lend themselves to unusual treatment.

Hillsides, even when very steep, can be made into attractive gardens provided they are developed as hillside sections and no attempt is made to adapt a plan suitable for a level, or near level, section. For an attractive frontage a slope up from the street is easier to plan than one below street level. Sections with a southerly aspect are not good, as they lack sun and are frequently cold and windswept.

When a section on a hillside is under consideration for purchase it is as well to consider the means of access from the house to road in relation to the physical condition of the occupants. The need for steep paths and steps can often be reduced if thought is given to the plan and the siting of the house. Difficult paths, drives, and steps often result if they are not considered when the house is being planned.

Slopes, hollows, rocky banks, and similar natural characteristics should not be looked on as disadvantages, for the most interesting gardens are usually developed on sections that are not perfectly level.

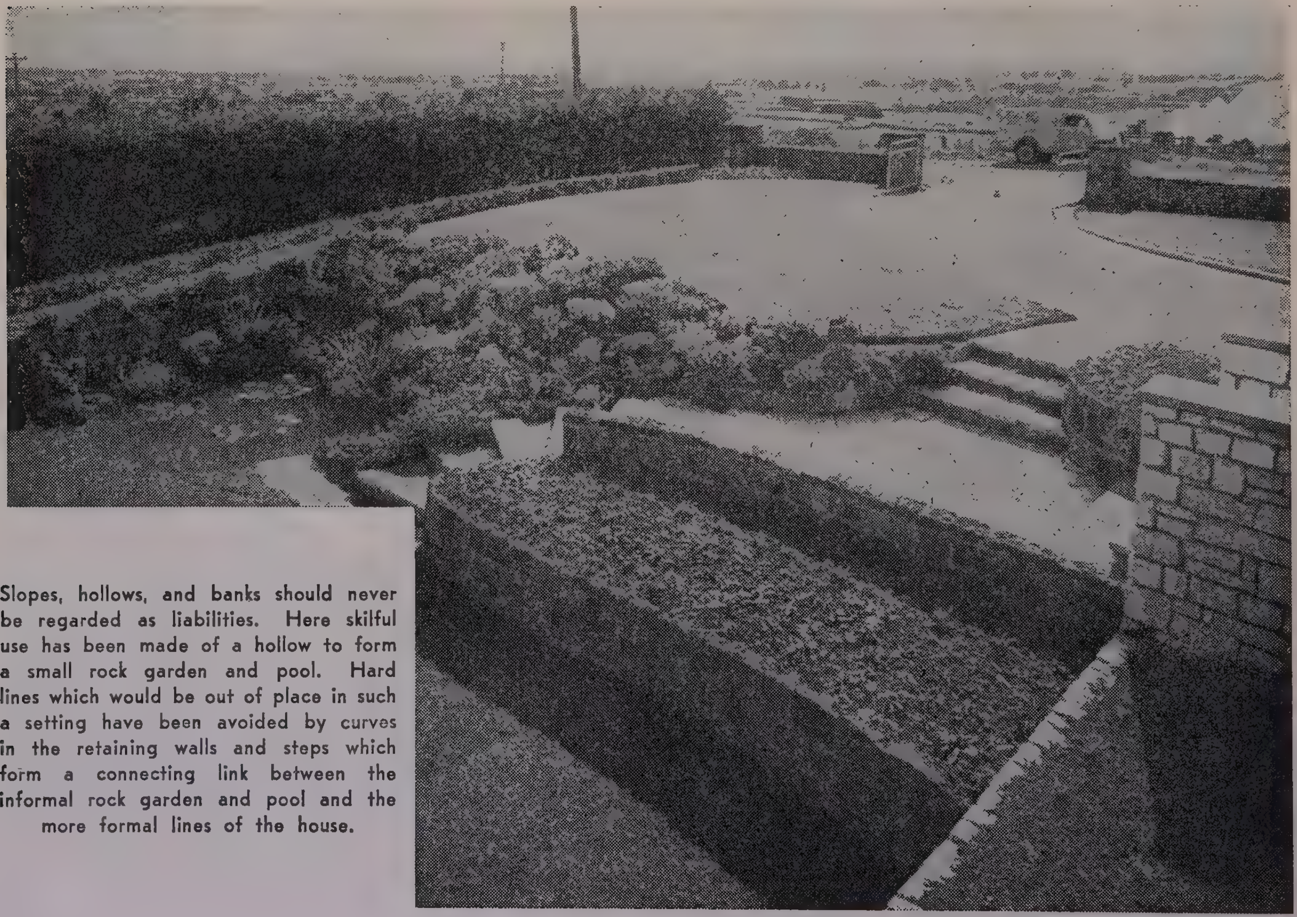
House and Garage

The old idea that the "front" of the house should face the road with the utility areas at the back is dying slowly. Home builders should seize the opportunity denied to owners and buyers of established houses to orient and site their houses to the best advantage.

Should the "back" with the kitchen, laundry, and garage become the "front" so much the better in many cases, for it brings the work areas nearer the essential services and gives privacy and quiet to the living part of the house and garden, which can then be enjoyed to the full.

There is no reason why the service area of a well-designed house and a carefully planned garden should not be attractive. It is sometimes difficult with such a house to place the clothes line where it will not be seen by the public, but it is usually possible to choose a position where it can be screened off from the street and from the ornamental part of the garden with a suitable planting of trees and shrubs or a trellis or fence.

When the plan and position of the house and garage are being decided on a number of points should be



Slopes, hollows, and banks should never be regarded as liabilities. Here skilful use has been made of a hollow to form a small rock garden and pool. Hard lines which would be out of place in such a setting have been avoided by curves in the retaining walls and steps which form a connecting link between the informal rock garden and pool and the more formal lines of the house.

watched which have a great influence on the garden plan. The doors very largely determine the positions of the paths and drives. If possible they should not face into the prevailing winds or be in a position where a complicated system of paths is needed. If an outdoor living area is contemplated, it should be in a sheltered position screened from the wind and public view and yet adjacent to the kitchen and dining-room. A dining-room with wide doors opening on to a terrace is ideal.

Views, both pleasant and unpleasant, should be considered. Those from the living rooms and kitchen are most important. Trees, shrubs, and perhaps trellis can be used to cut out unsightly views, but care should be taken not to interfere with pleasant ones. When trees are being planted their mature height or spread should be known to ensure that pleasant views will not be blocked out or that too much shade will not be cast in a few years' time.

The amount of sun the house will receive and the rooms which will receive it are important. For example, morning sun in the kitchen is good, but afternoon sun, especially in summer, can make it unbearably hot. Deciduous trees can often be used to shade the living rooms in summer, yet not cause any inconvenience in winter. Where possible the house should give protection to the garden, yet not cut off too much sun.

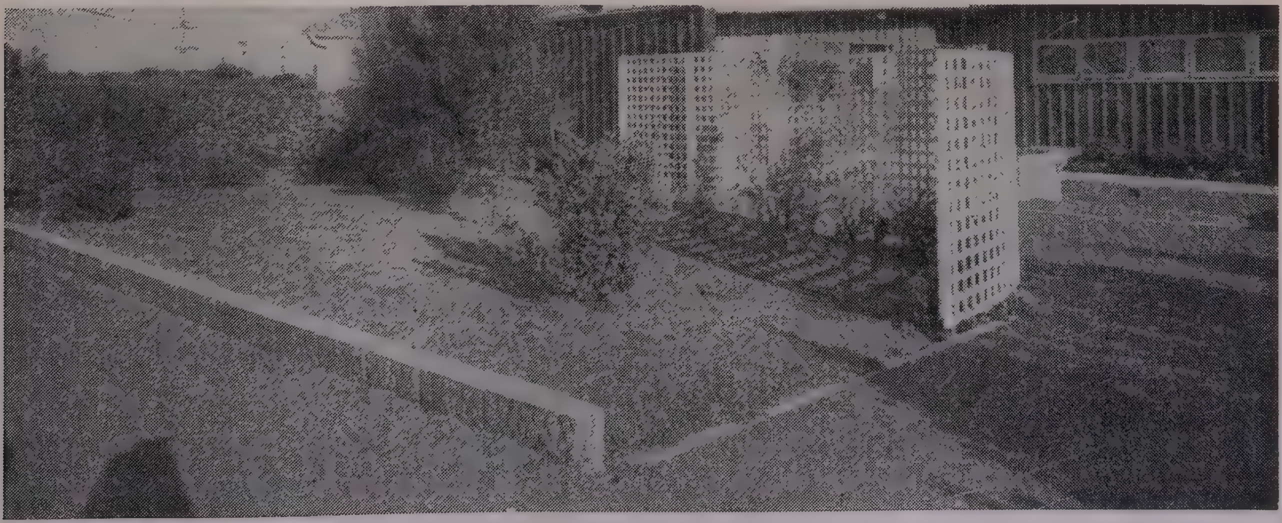
A convenient position for the garage should be chosen. It is often best attached to or under the house. Where this is not practicable the garage should be easily reached by a dry path. Garages on the street line make it more difficult to plan an attractive frontage and can spoil the general effect of the whole street.

Drainage

When a section is examined in summer the need for drainage is often not evident. If it is suspected that drainage may be poor in winter, it is

▲ This simple garden, which requires practically no maintenance, depends for its effect on a few well-placed trees toward the boundaries and shrubs with coloured foliage at the base of the house. An air of spaciousness has been achieved by keeping the centre of the lawn free of any planting.

▼ Trellis and a simple planting using only a few hardy trees and shrubs effectively screen off the garage, turn-about, and door.



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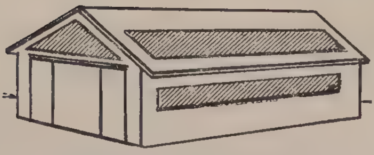
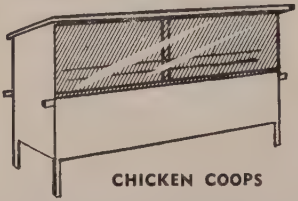
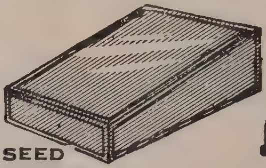


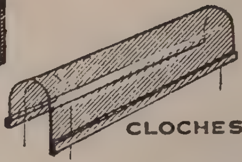
MORE LIGHT, EASILY FITTED



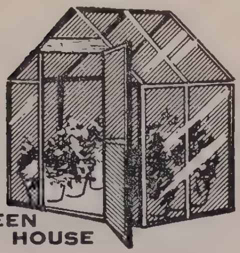
CHICKEN COOPS



SEED FRAMES



CLOCHES



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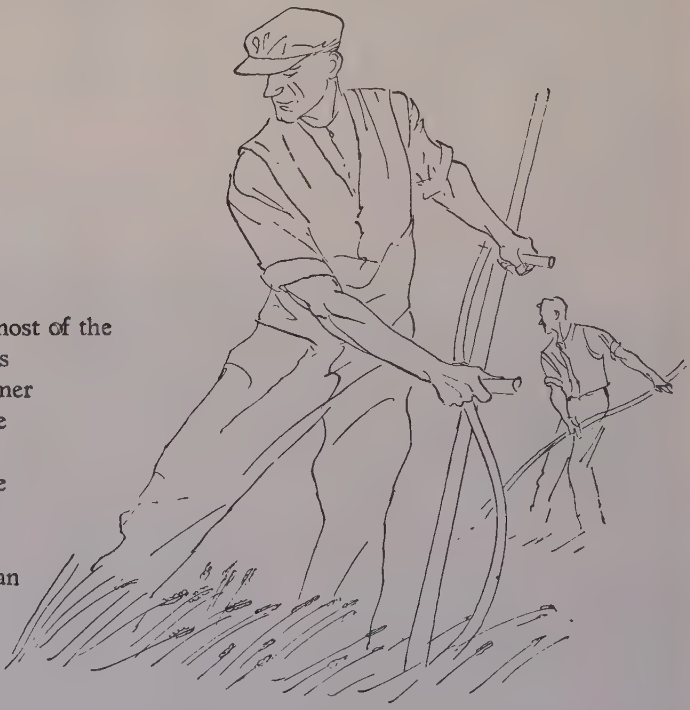

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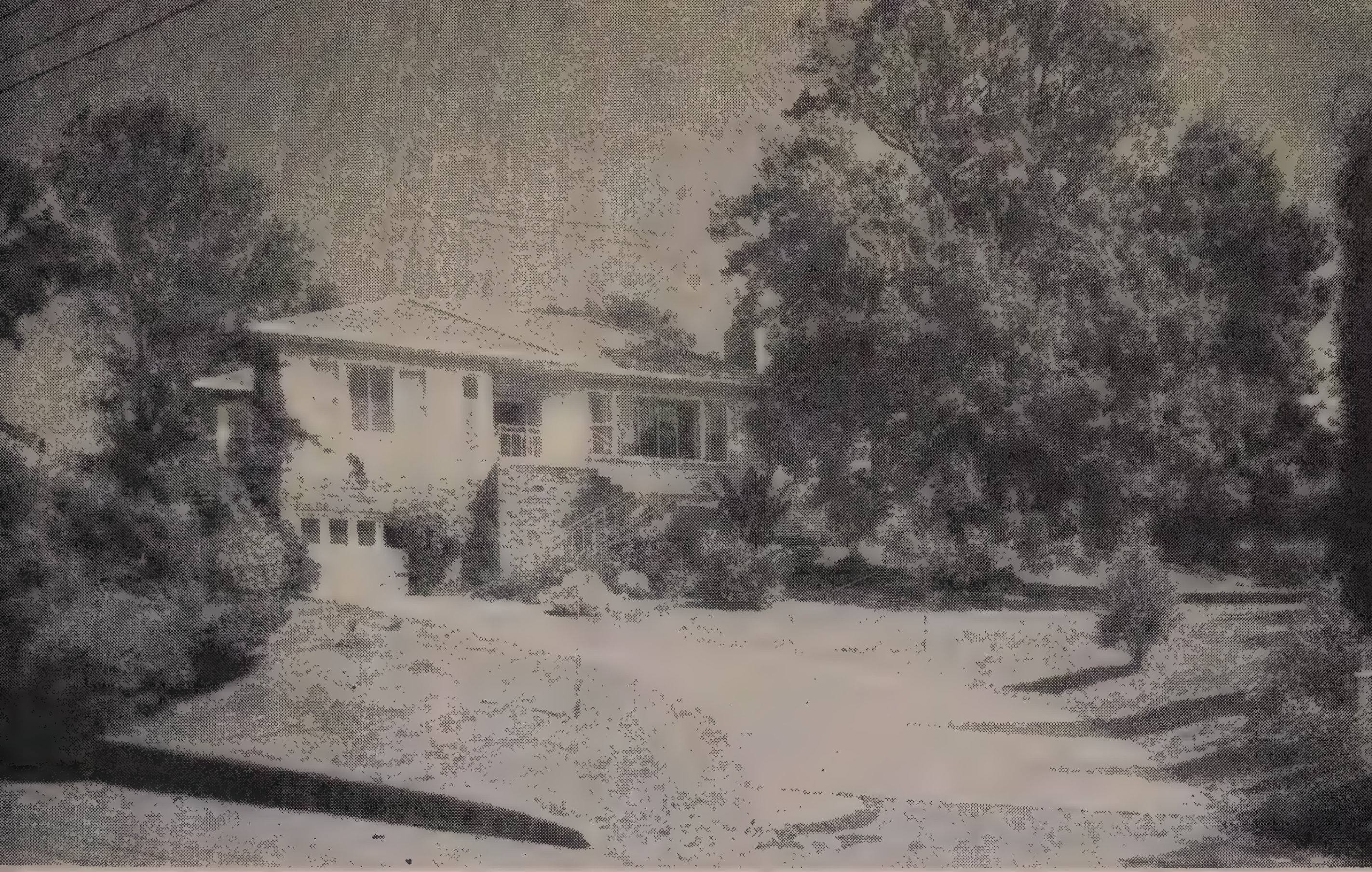


▲ Established trees on a section can give a garden an air of maturity in a surprisingly short time. The deciduous trees frame the house and give welcome shade in summer. The house, only 8 years old, has been set at an angle to the street to take advantage of the sun and views and to give easy access to the garage by a gently curving drive. The lawn has been graded to follow the natural contours of the section and where the bank becomes too steep shrubs have been planted in a solid mass which also serves to balance the high mass of green on the right. Planting round the base of the house has tied it into the garden harmoniously.

well to make inquiries of someone who knows the area.

Drains are needed not only on low-lying areas, for under some soil or subsoil conditions drainage may be poor on slopes or ridges. On slopes it should be noted if residents higher up are channelling water down, as they are legally entitled to do in many cases, and if so, whether this water can be disposed of conveniently. On low-lying areas disposal of storm water is sometimes a problem. Unsuspected springs and seepage can often cause trouble, especially at the bases of slopes.

The suitability of the soil or subsoil for septic tanks (where necessary) and their outfalls should be considered. It is best for outfalls to run under lawns or vegetable gardens, where they are reasonably accessible and will not be blocked by the entry of roots of trees, shrubs, or large permanent plants.

Though springs, streams, wet patches, and drains can be a nuisance, a keen gardener can often use them for growing moisture-loving plants and so create a garden that is a little different.

(Drainage will be discussed fully in a later article dealing with soil improvement.)

Service Connections

Connections such as sewers, water or gas pipes, power lines, etc., can have a considerable bearing on the types of plants grown and their position. One of the commonest mistakes, especially on small sections, is planting tall trees under power and telephone lines. Future telephone connections should be considered before planting is done. Some trees with vigorous root systems can disrupt paths or underground connections, and other such as willows can block open and field tile drains. No heavy constructional work such as rock gardens or concrete drives should be placed over sewers, etc., if avoidable. If any excavating is contemplated in the future, pipes should be set deeply when laid so that they will not be exposed later.

Climate

Temperatures, rainfall, and wind all influence the type and range of plant material that can be grown. In general only plants suitable for the local climate should be used. However, it is possible to alter the conditions to some degree to make the growing of a wider range of plants possible. By the provision of adequate shelter the force of winds can be reduced if not completely stopped, and cold draughts can be stopped by suitable hedges, shrub borders, or fences. Plants requiring cool, shady positions can often be used if suitable shade trees are grown; in cool districts tender plants are often happy in a warm corner formed by the angle of two walls. In coastal districts with salt winds tolerant plants will be necessary.

Soil

Before the garden is planned the soil on all parts of the section should be examined thoroughly so that the depth and nature of the topsoil and subsoil are known and to find out if rocks or a hard pan are present. It is sometimes possible to site the house, fowl run, or drive on parts which are unsuitable for gardening. Lawns can usually be established satisfactorily on shallow soils which are unsuitable for deeper-rooting plants.

If levelling is necessary, the topsoil should be retained if possible. This is best done by skimming off the top fertile layer and doing the necessary

GARDEN PLANNING . . .

levelling to the subsoil. The topsoil is then returned over the loosened subsoil so that the two become blended. It is impossible to get satisfactory results if the topsoil is simply placed over a hard, compact base.

Where the house site has to be levelled the topsoil should be kept separate from the subsoil so that it can be used for top filling on other parts of the section. If large areas of subsoil are exposed as a result of levelling operations, it may be a number of years before a satisfactory garden can be established. The effect is worse where heavy machinery has been used. Banks, which are usually formed as a result of levelling, are one of the most difficult problems to deal with.

A knowledge of the soil type will enable the most suitable plants to be grown when it is considered together with climate and drainage. (Soils will be discussed in a later article.)

Existing Features

Established trees and shrubs should be retained if possible, for nothing gives the impression of permanence and maturity to a garden as well as trees. Many large estates about old homes are now being split up into building sections. Very frequently these have fine trees which have taken many years to grow, but only too often they are thoughtlessly destroyed.

In overseas countries home builders are becoming increasingly aware of the value of established trees and go to a great deal of trouble to preserve them. It is not an uncommon occurrence to have houses designed especially to make the most effective use of them. Unfortunately many New Zealanders think of a tree on a section as a liability which must be removed as quickly as possible, for they do not realise that mature trees are the greatest asset a new garden can have.

Trees and shrubs on surrounding properties, too, can be incorporated in the garden design. They can often be used as a background to the house or some other feature and they can be utilised as shelter. Far too frequently home owners regard the neighbours' trees as nothing but nuisances and fail to see their advantages. The landscape would be very uninteresting if it were not for the trees on other properties.

Other features of the site such as rocks, hollows, and slopes can be used in many interesting ways.

Labour and Cost

The labour required and the cost both of the initial layout and the subsequent maintenance influence the design in many ways. These can often be cut to a minimum by using a simple layout with more or less permanent plants. Shrub borders, for example, need very little maintenance when compared with beds of annuals which require frequent and often costly replanting to give perhaps two rather fleeting displays in a year. A garden with a few well-placed trees and a group or two of shrubs can provide interest throughout the year if they are selected with care.

It is better to decide in the first place on a simple garden which can easily be maintained in an attractive condition than attempt something more ambitious which cannot receive adequate attention.

Personal Factors

Apart from labour and costs many other personal factors have a bearing on the design of the garden. Size of family, ages, physical condition, and personal tastes have to be considered.

For example, young couples with families may require an extensive vegetable garden with perhaps some fruit trees and a large play area. Retired couples may need only a simply kept flower garden. Those who grow special plants as a hobby or keep poultry or pets will need to plan accordingly. Some plants like alpines and roses can be incorporated in the general design, but others, especially those with short flowering seasons such as daffodils, are better given an isolated plot to themselves.

Seldom can a garden plan be successfully copied in its entirety, for there are slight differences in every section as well as in the design of the house and the requirements of the owner. The study of good gardens or published plans will often give an idea which can be adapted or elaborated to suit another section.

Those who are about to plan a garden should study gardens built on similar sections to their own. Any which appeal and which are interesting throughout the year should be analysed to find out what makes them attractive. Generally good gardens have an air of permanence and are in harmony with the house. Bearing in mind the points previously mentioned, an observer will probably see how this has been achieved and will get an indication of the way in which a satisfying garden can be developed.

Where a number of new houses have been built on adjoining sections there is an excellent opportunity of developing the area as a whole. The gardens can have individuality, but with co-operation the area can become a community of homes rather than just a collection of houses.

Garden Work for July

Routine work in July consists largely of tidying up and doing odd jobs for which there will not be very much time when the growing season begins again. As in June, a fairly heavy rainfall is usual throughout the country, and work in the garden becomes a matter of doing as much as possible in a fairly short time when the soil is not too wet.

The clearing away of rank and dead grass and weed growth, especially from around fences, stone walls, and similar places, will remove the hiding places of slugs, snails, and slaters. Where complete clearance of the pests is not possible, the use of poison baits laid nearby will kill many slugs and snails. These baits are most easily made by crushing a metaldehyde tablet, mixing it with a cup of bran, and slightly damping but not wetting the mixture with water. Place it in small heaps where the pests are suspected to be and if necessary cover it with a piece of old tin, bent so that it is not lying flat on the ground.

Slaters are controlled by dusting the area with DDT.

Rose Pruning

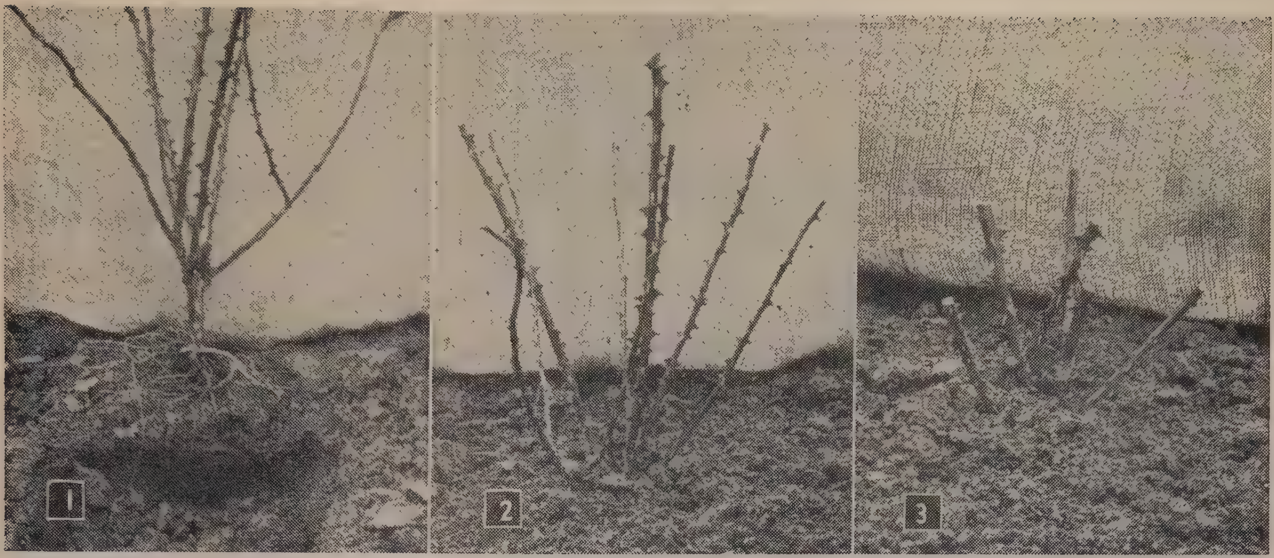
Roses may be pruned toward the end of the month in districts where there is no danger of hard late frosts killing the young shoots. The principles of pruning were given in last month's notes. Secateurs, saws, and any other tools used in pruning must be sharp; not only is the work made easier, but the damage to the plant tissues is minimised.

Hybrid tea bush roses are cut back to about 18in., depending on the vigour of the bush and to a certain extent on the variety. Any dead or obviously diseased wood and as much old wood as possible should be removed, leaving strong, healthy shoots of 1- or 2-year-old wood. Water shoots, which grow and flower in summer and have not had time to harden off, should be left untouched or removed altogether. If they are pruned in a similar fashion to the spring growths, that is, cut back fairly hard, there is every likelihood that they will die back, leaving unsightly brown tips on the shoots.

Standards are pruned in exactly the same way as bushes, though more attention may be paid to the shape of the head, as this acts more as a focal point than in the lower-growing bushes.

Weeping standards are not pruned at the same time as the other roses, but should be done as soon as they have finished flowering. The long new canes are left and those that have flowered should be removed. If they are pruned in the same way as ordinary standards, they will not maintain their weeping habit.

If flowers are wanted for exhibition purposes, the bushes should be cut back harder, a practice which results in fewer but better-quality blooms. This is not recommended for the average home gardener, who may prefer to have more flowers of perhaps slightly lower quality.



1—Rose bush received from the nursery and ready for planting. 2—Rose bush planted; the shoots have been tipped by the nurseryman, but have not been pruned. 3—Newly planted rose bush correctly pruned. An established bush would not be pruned so hard except for exhibition purposes.

Hybrid polyantha and floribunda roses are not pruned as hard as the hybrid tea bushes, but are left with longer shoots. If possible, remove all the growths that have flowered and leave only the new, young ones, shortening them back slightly.

Any new roses that have been planted should have been pruned at planting time, except in southern districts, where they should be left until the danger of severe frosts is over. The nurseryman from whom the plants are bought will usually prune them if asked to do so, but the experienced gardener will doubtless rather do them himself.

Often bushes received from the nursery have been cut back to make them easier to pack, but they may not have been pruned properly. To encourage good growth and to train them into desirable shapes they should be cut back to correspond roughly with the root growth, and if a number of the roots have been damaged in transit, the tops will have to be cut back in proportion.

Pruning of Shrubs

Shrubs which flower on current season's wood may be pruned now to promote new growth and a good show of bloom. All ornamentals should be pruned with the future shape of the bush in mind, as nothing looks more unsightly than a one-sided specimen or one that has been unnaturally pruned to give it a flat top. If a large branch either of a shrub or a tree has to be removed, the cut should be sealed with a sealing compound to protect it from the weather and from fungous attack.

Examples of shrubs that may be pruned now are *Ceanothus* Gloire de Versailles, *Spiraea japonica* Anthony Waterer, *Clematis jackmani*, and *Buddleia variabilis.*

July is a good month for transplanting any shrubs that may not be doing well in their present positions. Wrenching evergreens before they are moved is a good practice, as it lessens the shock to the plants and they start into growth more rapidly. Two or 3 weeks before transplanting make a straight cut with a sharp spade a little distance from the main trunk to sever the roots on one side. After an interval of 3 or 4 days repeat this on the opposite side. The hole in the new situation should be dug in advance and any fertiliser to be used well mixed in with the soil.

It is very important that the roots of any plants that are being moved or planted out for the first time should not be allowed to dry out in the sun or wind. Try to leave as much soil as possible around the roots of evergreens, and if the shrub is being moved some distance, place it on a piece of scrim for carrying, as more soil will be retained in this way. A light pruning when the plant is in its new position will help to balance the loss of roots and staking may also be necessary for a while.

In the warmer districts hardy herbaceous perennials such as kniphofias, rudbeckias, and heleniums can be planted out and also some of the bedding plants used for spring flowering. The seeds of hardy annuals for summer bedding may be sown under glass in the warmer parts of the country, but no attempt should be made to do this in districts where some of the worst frosts of winter are yet to come.

Testing Drainage

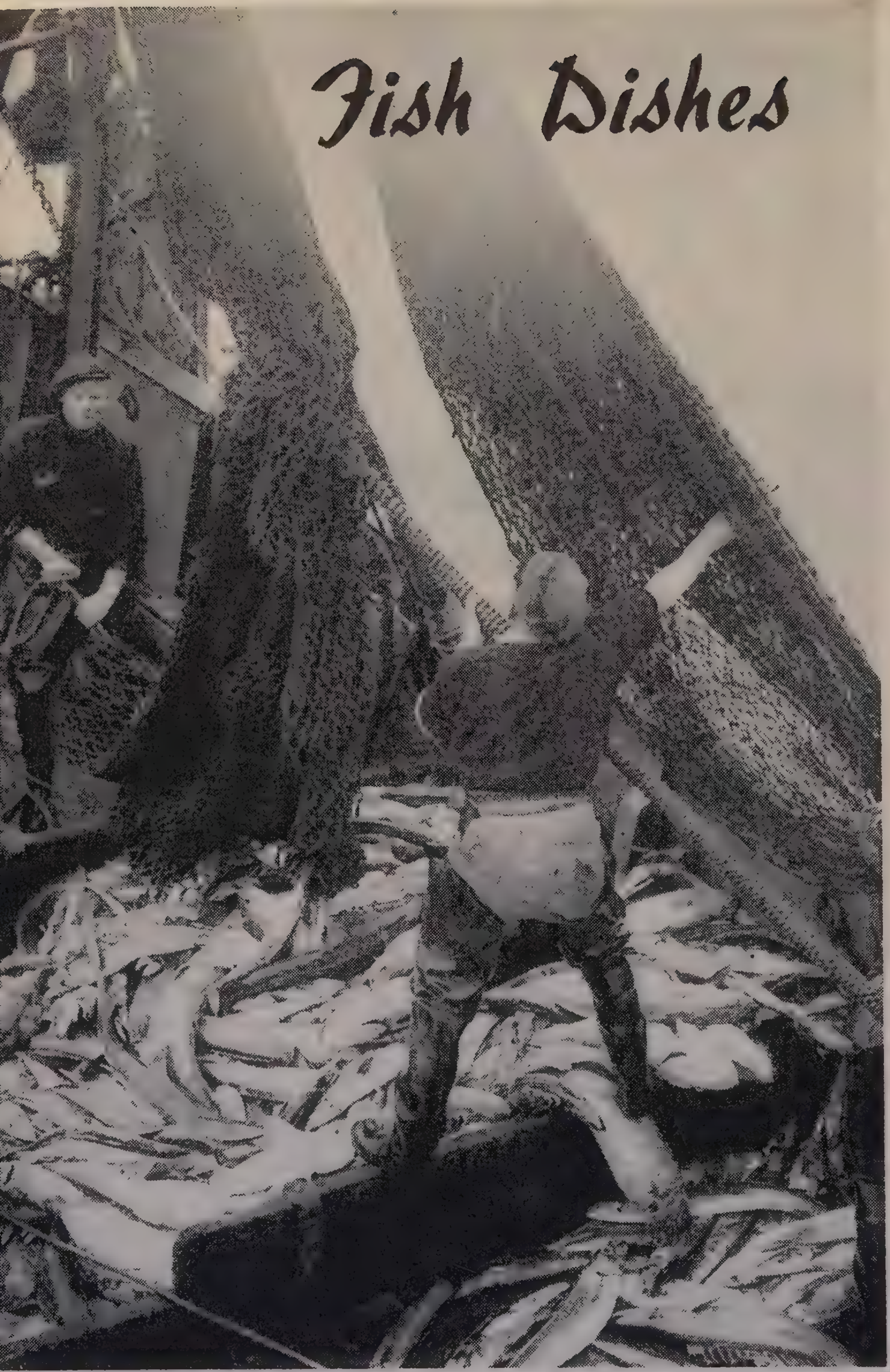
During winter it is worth while, especially on a new property, to find out what the drainage is like, either over the whole area or in selected parts where it has been decided to plant shrubs that like a fairly dry situation throughout the year. Dig several holes, the number being determined by the size of the area, about 2ft. deep and see to what level the water rises in them after heavy rains. This should give a good indication of the need for drains and the depth to which they should be laid. If the water level is high, the tiles will have to be laid deeper than 2ft. to make sure that the roots of trees and shrubs are free from water lying around them. To be effective all drains must have a free outfall either by running into another drain or into a deep sump.

If lawn aeration was not done during late autumn, it may be carried out now, though the result will probably not be as satisfactory as when it is done in autumn.

A winter oil spray applied to roses, deciduous shrubs, and trees, including fruit trees, will be beneficial. It kills any scale insects that may be present on the wood and large numbers of various insect eggs. This spray may also be of help in healing over small pruning cuts. To make up 4 gallons of spray 1 3/5 pints of oil are used. Winter oil sprays should not be used on evergreen trees or shrubs.

Photographs, except those on this page, by Sparrow.

Fish Dishes



By ELIZABETH LAURENSON,

formerly Field Officer in Rural Sociology, Department of Agriculture, Auckland

FISH is a protein food and therefore excellent for building and repairing muscle and other body tissue. When fish is available it can be used in place of meat to provide variety in the menu. Oily fish are good sources of vitamins A and D, and salt water fish, particularly shellfish, are rich sources of iodine. Because fish is soft in texture and rather lacks flavour and colour it is often combined with crisp colourful foods and served with highly flavoured or acid sauces. Thought should be given to the way in which fish is served so that it looks attractive and appetising.

THE ideal fish is that freshly caught, straight from river, lake, or sea. Fish tastes best if it is fresh, so it is important to recognise the signs which indicate whether it is fresh or stale. The following are characteristics of really fresh fish and are the points to remember when buying fish:—

1. The gills should be bright red.
2. The flesh should be firm but elastic and if the fish is pressed, the mark made by the finger should fade at once.
3. The eyes should be bright and full, not grey and sunken.
4. There should be a fresh, salty odour and no unpleasant smell.
5. The scales should cling firmly to the flesh and should be bright and shiny, not dull.

Though fish should be cooked and eaten the day it is caught, this is not always possible. Fresh fish should be kept in the refrigerator until it is used. In most refrigerators the best place to keep the fish is in a covered dish directly under the freezing unit.

Preparation for Cooking

Usually bought fish are cleaned and prepared and need very little attention before they are cooked. Directions for preparing fish which have not already been prepared are given on the opposite page.

Methods of Cooking

Fish may be cooked in many ways, but for certain varieties of fish some methods are better than others. For example, fat or oily fish are better cooked without the addition of fat, whereas white fish which contain little fat can be fried. Fish should be cooked at a moderate temperature for sufficient time to soften the connective tissue. The cooking time is much shorter than the cooking time for meat, as fish has less connective tissue. Overcooking causes toughening of the protein.

Fried Fish

Fish may be fried whole or in steaks or fillets, depending on the size. To prepare the fish for frying it should be washed, dried, and dipped in seasoned flour. It is important that the fish should be dried thoroughly before it is floured. The fish is then coated in various ways. The coating prevents the fat from soaking into the fish during frying and also helps to retain the flavour and moisture of the fish.

The prepared fish may be dipped in egg and breadcrumbs. The egg is beaten and poured into a shallow dish or plate. Each fillet is dipped into the egg so that both sides are covered. The fillet is then drained slightly and

Scaling (Top)

To remove the scales on freshly caught fish hold the fish by the tail and with a knife scrape firmly from the tail toward the head against the grain of the scales. Use the back of the knife and do the scraping on a newspaper to catch the scales. Wash the fish to remove any loose scales and then wipe it dry. If the scales are very difficult to remove, plunge the fish into boiling water for a minute or two to loosen them; they can then be removed more readily.

Cleaning (Middle)

To clean the fish turn it on its side and make a slit across the throat just below the gills. From here make a slit down the belly toward the tail. Cut through the gills and scrape out the entrails. The roe may be kept if desired. The head is usually removed, but if it is left on, the eyes should be removed. With a flat fish such as a flounder the entrails can be removed when the head is cut off. The black skin lining the cavity of some fish can be removed by rubbing the lining with a little cooking salt. Wash the fish well and drain it.

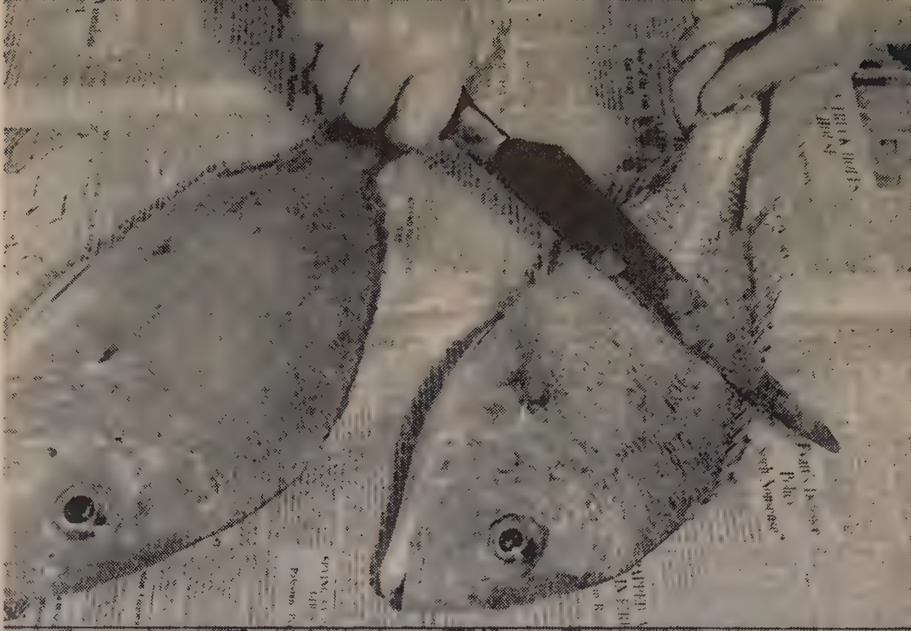
Skinning (Bottom)

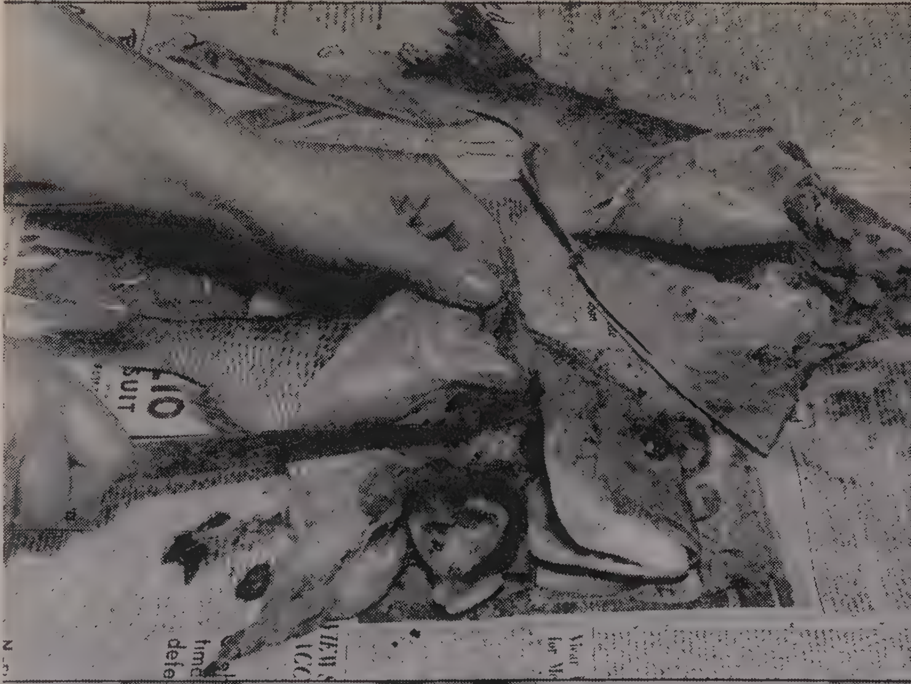
If a fish is to be skinned, the scales need not be removed first. Flat fish (right) may be skinned whole and the head removed at the same time. Place the fish on a board or on newspaper, light side uppermost, and with a sharp knife cut behind the head through the backbone. Take care not to cut the dark skin. Turn the fish over and scrape out the entrails. With one hand grasp the head and pull; the dark skin will come away from the flesh with the head. Hold the fish steady with a knife held in the other hand as shown in the illustration.

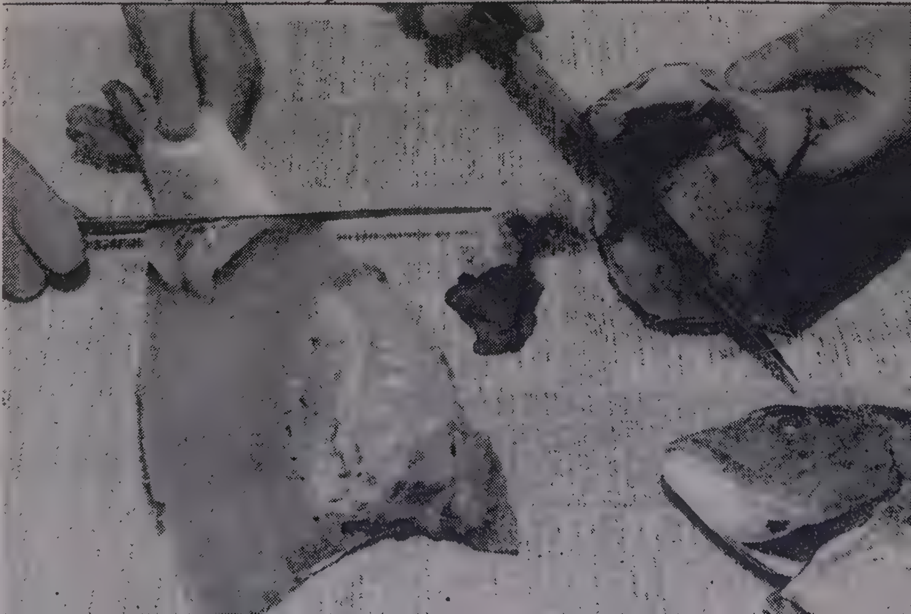
Large fish are usually skinned after they are filleted (left). Place the fillet, skin side down, on the board. Hold the tail end in one hand, take a knife in the other hand, and use it to scrape and roll the fillet from the skin.

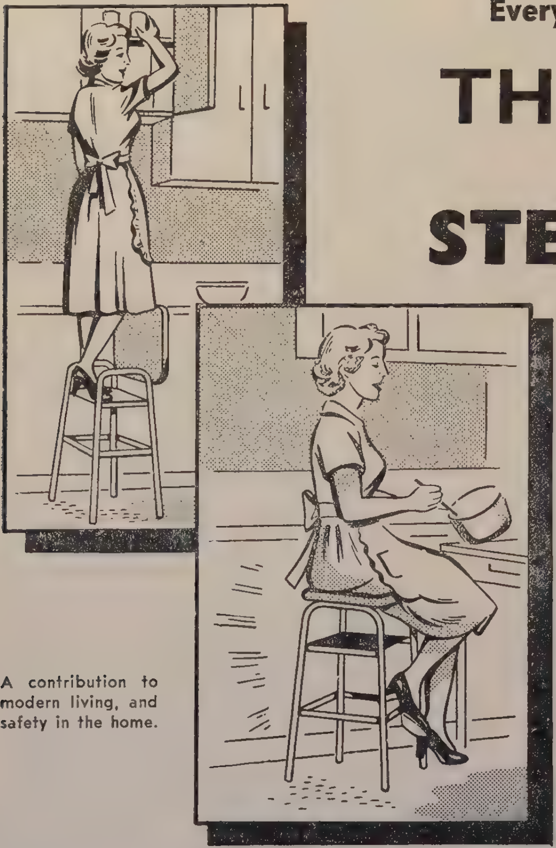
Filleting

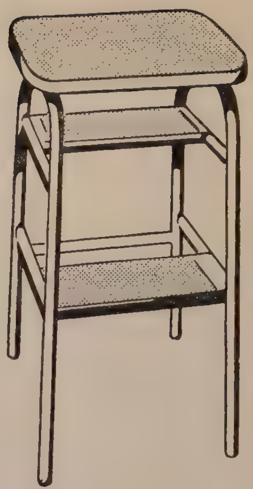
For filleting start at the head end, using a sharp knife. Slide the knife along between the bones and the flesh, working toward the tail, and remove the flesh from one side. Turn the fish over and cut off a second fillet from the other side.











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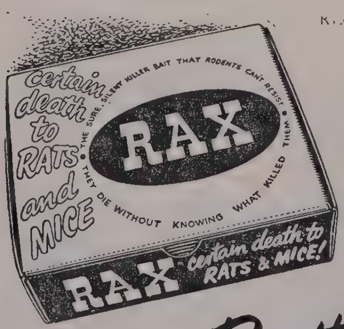
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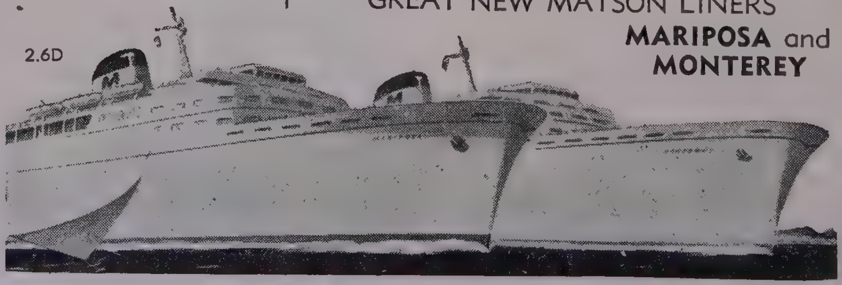

laid in fine, dried breadcrumbs which are already prepared and seasoned with salt and pepper. Sprinkle the breadcrumbs thickly on both sides; then shake off any superfluous crumbs and put the fish into the hot fat.

When eggs are scarce fish may be dipped in milk and oatmeal or flaked cereal. Fish may also be fried in batter. The floured fish is dipped into the batter on a fork or skewer and allowed to drain a little before being lowered into the hot fat. The following are two batter recipes suitable for coating fish:—

2 heaped tablespoons of flour
¼ pint of milk
Salt
Pepper

Stir the mixture until it is smooth. If desired, a pinch of baking powder may be added just before the batter is used.

1 egg
2 tablespoons of flour
Milk to mix
Salt and pepper

Beat the egg and add it to the sifted dry ingredients. Add sufficient milk to make a coating batter.

There are two methods of frying—deep frying and shallow frying. For deep frying 1lb. to 1½lb. of clarified dripping is put in a heavy deep pan and heated until a faint blue smoke rises. The fish is then placed in the hot fat one or two pieces at a time and cooked until the coating is crisp and golden brown. If the fillets are thick, the heat may be lessened as the fish begins to brown; otherwise the outside will be over-cooked before the fish is done. When the fish is cooked drain it well on a hot plate covered with kitchen paper. Keep the fish hot and serve it as quickly as possible on a hot dish garnished with lemon and parsley.

For shallow frying enough fat is used to coat the bottom of the frying pan, and this is heated until a faint blue smoke rises. The fillets are fried on one side until golden brown and then turned with a fish slice and cooked on the other side. Lift the fillets or steaks on to a hot plate covered with paper to drain. Fried fish should never be covered, as it becomes sodden if the steam is not allowed to escape.

Grilled Fish

Fillets are wiped dry and then brushed over with melted butter, dripping, or bacon fat. Season them with salt and pepper and lemon juice. Place the fillets on a greased grill tray and cook them under the grill for 5 to 10 minutes on each side, depending on the thickness of the fillets.

Boiled Fish

Whole fish or thick steaks of fish may be boiled. Prepare the fish and have ready in a saucepan enough salted water to cover it. Salt should be added in the proportion of 2 teaspoons to a quart of water, and 2 teaspoons of vinegar or lemon juice may be added to keep the flesh white. A few peppercorns and one or two cloves may give a variation in flavour. The water is heated to just below boiling point and the fish is lowered into the saucepan. The fish may be wrapped in cheese cloth to prevent it from falling to pieces. Care must be taken that the fish is allowed to simmer gently but does not boil. Cook the fish until the flesh separates easily from the bone (about 10 minutes to the pound). Avoid over-cooking or the fish will be flavourless. Drain the fish carefully and serve it with a well-flavoured sauce.

Steamed Fish

Steaming is an excellent way of cooking fish for children or invalids. Small whole fish, fillets, or thin steaks may be steamed between two plates placed over a saucepan of boiling water. Prepare the fish, place it on a plate which has been greased with butter, and sprinkle it with lemon juice and salt and pepper. Cover it with another plate and stand it over a saucepan of boiling water. Serve it with parsley sauce and cut lemon.

Baked Fish

Whole fish, steaks, or fillets may be baked in the oven, but the fish must not become dry in the process. Fillets are floured, coated with egg and breadcrumbs, and arranged in a greased ovenware dish. Dot the fish with butter and cover it with a piece of greased paper to prevent it drying. Cook it at a temperature of 375 to 400 degrees F. Small fillets take only 10 to 15 minutes to cook. Large, thick pieces require 15 to 20 minutes. Fillets may also be baked in milk. Flour the fillets and arrange them in a greased ovenware dish. Dot them with butter and pour in a little milk. Cover them with greased paper.

Sauces to Serve with Fish

Fish by itself is lacking in flavour and for this reason sauces are served with it to make it more appetising. Garnishes are chosen which provide colour and help to make fish dishes more attractive. Lemon slices either plain or dipped in parsley are used as garnish, and for boiled fish paprika, minced, hard-boiled eggs, sliced cucumber, capers, and tomatoes give colour.

Most sauces can be made in advance and can be kept hot over boiling water until required. Several good sauces have the same base with different ingredients added.

Foundation White Sauce

2 tablespoons of butter
2 tablespoons of flour
1 cup of milk
½ teaspoon of salt
Pepper

Melt the butter, stir in the flour, gradually add the milk, and stir the mixture until it boils and thickens. Cook it about 3 minutes longer, stirring it all the time. Add seasonings. Place the sauce over hot water to keep hot and cover it tightly to prevent a skin from forming. Liquid fish stock may be used in place of some of the milk.

The following are variations of the above recipe:—

Parsley Sauce

Add 2 tablespoons of chopped parsley to the cooked sauce. Serve it with steamed or boiled fish.

Egg Sauce

Add two finely chopped hard-boiled eggs just before serving the sauce, which should be used with boiled fish.

Cheese Sauce

Add ½ to 1 cup of grated cheese to the hot sauce just before serving it and stir the sauce until the cheese is melted. Do not reheat the sauce or the cheese will become stringy.

Shrimp Sauce

Add ½ to 1 cup of canned shrimps. Serve the sauce with boiled fish.

Oyster Sauce

Add ½ cup of oysters to 1 cup of sauce. Serve the sauce with boiled fish.

Anchovy Sauce

Add 1 teaspoon of anchovy essence to the sauce.

Mustard Sauce

1oz. of butter
1 teaspoon of flour
½ cup of water or liquor from boiled fish
1 teaspoon of dry mustard
2 teaspoons of vinegar

Melt the butter in a saucepan and add the flour and mustard. Gradually add the liquid, mixing carefully. Heat the sauce to boiling point, stirring it constantly, and cook it for 3 minutes longer. Add vinegar and salt.

Drawn Butter Sauce

4 tablespoons of flour
5 tablespoons of butter
2 cups of boiling water
½ teaspoon of salt

Melt 4 tablespoons of butter and stir in the flour. Gradually add water and cook the mixture for 5 minutes or until the sauce is thick and smooth. When the sauce is ready to serve add the salt and the remaining butter, beating the sauce well. The sauce may be seasoned to taste with anchovy essence.

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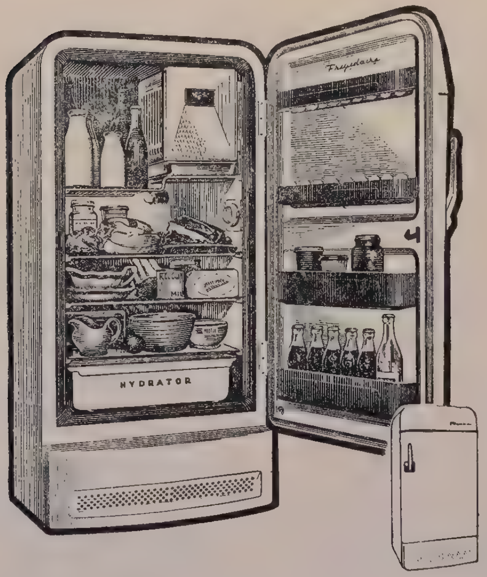

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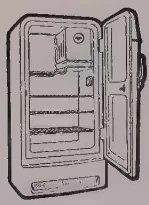

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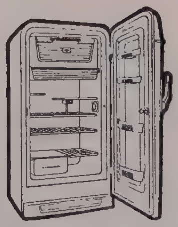

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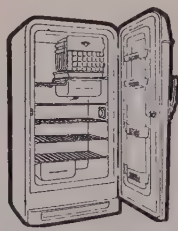

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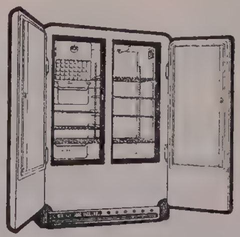

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Tomato Sauce

2 tablespoons of flour
2 tablespoons of butter
1 onion (chopped)
2 or 3 bacon rinds
Pepper
4 medium-sized tomatoes
½ cup of water
½ teaspoon of salt
½ teaspoon of sugar

Fry the onion and bacon rinds. Add the tomatoes (sliced) and water. Cook the mixture and strain it through a sieve. Melt the butter. Stir in the flour and gradually add the strained tomato mixture. Stir the mixture until it boils and thickens. Bottled tomato puree may be used if desired.

Sauce Tartare

1 cup of mayonnaise
2 tablespoons of chopped gherkins
1 tablespoon of chopped parsley
1 teaspoon of finely chopped onion

Mix the ingredients together. This sauce is good served with fried or grilled fish.

Mock Hollandaise Sauce

2 tablespoons of butter
½ cup of hot water
1 teaspoon of lemon juice
1 tablespoon of flour
⅕ teaspoon of salt
½ egg yolk

Melt half the butter in a saucepan, add the flour and salt, and stir the mixture until it is smooth. Cook it for a few minutes, add water gradually, and stir the mixture while it thickens. Simmer it for 1 to 2 minutes. Add the remaining butter and stir the mixture until the butter is absorbed. Just before serving the sauce add lemon juice and slightly beaten egg yolk.

Maitre d'Hotel Butter

1oz. of fresh butter
Salt
1 teaspoon of finely chopped parsley
1 teaspoon of strained lemon juice
Pepper

Soften the butter until it is creamy. Add parsley until it is evenly mixed, then gradually work in the lemon juice. Add salt if necessary. This sauce is very good with grilled fish.

Fish Recipes

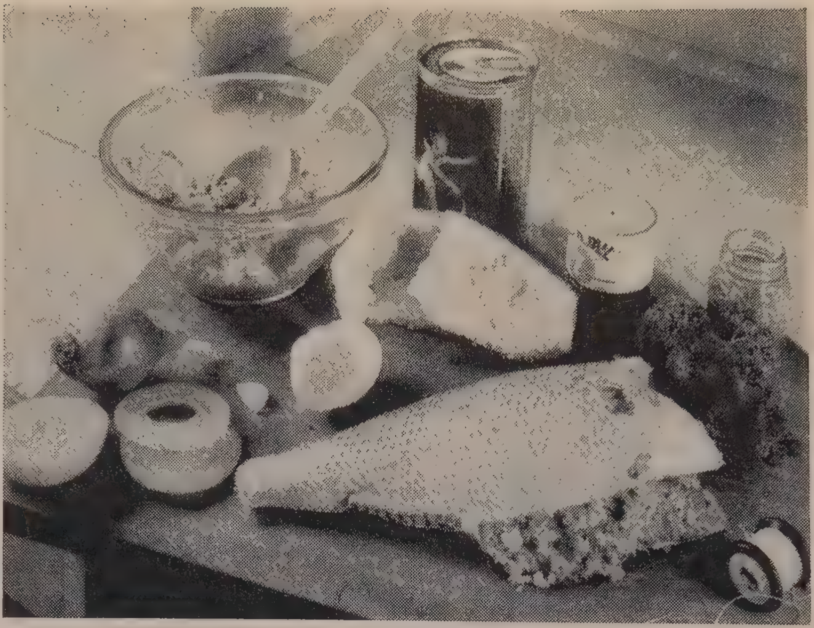
Soused Fish

2lb. of fish (preferably oily)
1 teaspoon of salt
1 teaspoon of sugar
1 onion (sliced)
6 cloves
1 teaspoon of peppercorns
1 bay leaf
Vinegar

Clean the fish and cut it in pieces of suitable size. Place it in a pie-dish or casserole. Sprinkle it with the seasonings and barely cover it with the vinegar. Cover the dish and bake the fish for at least 1½ hours (or until it is tender) in a slow oven. Long cooking improves the flavour and makes the bones soft so that they can be eaten. Leave the fish in the dish to become cold and serve it with salad.

Fish Chowder

1lb. of white fish
3 cups of cold water
2 slices of bacon
1 onion
4 crackers
1½ cups of diced carrot
2 cups of milk
2 teaspoons of salt
4 potatoes



Preparing a baked stuffed fish.

Wash the fish and cut it into cubes. Cook the bones and skin in cold water for 20 minutes. Strain off the liquor. Cut the bacon in small pieces and fry it with diced onion; drain it well and add it to the hot liquor and vegetables and diced fish. Cook the mixture for 20 minutes. Add the milk and the crackers broken into small pieces and simmer the chowder for 5 minutes. Serve it hot with chopped parsley.

Baked Stuffed Fish (Whole)

Whole fish filled with stuffing can be baked in a flat ovenware dish. Clean the fish and prepare it for stuffing with or without the head and tail. If the head is left on, the eyes must be removed. The stuffing is put in the opening through which the fish has been cleaned. Sew up the opening with a large needle and strong thread and place the fish on a greased baking dish. Brush it with melted butter and cover it with greased paper. Strips of bacon can be laid across the fish. Bake it in a moderate oven (375 to 400 degrees F.), allowing 10 minutes per pound. Remove the paper for the last 10 minutes to brown the fish slightly.

Stuffing

1 cup of soft breadcrumbs
1 tablespoon of chopped parsley
1 small teaspoon of mixed herbs
1 teaspoon of finely chopped onion
Salt
Pepper
1 egg, slightly beaten

Mix the dry ingredients and moisten them with the beaten egg.

Baked Fish (Swedish Style)

2lb. of groper slices or fillets of sole
¾oz. of melted butter
3oz. of sliced onion
1lb. of tomatoes
⅔ cup of top milk

Wipe the fish and remove the skin. Place the fish in a greased casserole. Sprinkle it with salt and pepper and brush it with melted butter. Place sauted onion and sliced tomato over the fish. Bake the dish in a moderate oven (350 degrees F.) for ½ hour. Then pour the top milk over the fish and bake the fish 10 minutes longer.

Sole a la Melba

1 large sole
1oz. of cheese
1oz. of butter
1 egg
1 teaspoon of anchovy essence
1 onion
1 to 2 tomatoes

Remove the fish's skin, eyes, and side fins, and wipe the fish. Make an incision down the backbone and make two pockets on either side of the backbone. Rub salt inside the pockets and fill the pockets with stuffing made from cheese, butter, hard-boiled egg, and anchovy. Brush the fish over with slightly beaten egg and sift fine dried breadcrumbs over the surface. Over the incision place alternate slices of onion and tomato. Bake the fish in a well-greased pan until it is tender at a temperature of 350 degrees F. Serve it with lemon and parsley garnish.

Dishes from Cooked or Canned Fish

Left-over fish or canned fish can be used in the following recipes:—

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4 ozs. butter, 8 ozs. sugar, 2 teaspoons golden syrup, 2 tea cups milk, 1 level teaspoon soda, 10 ozs. flour, 1 teaspoon Edmonds Acto Cake Powder, *2 teaspoons cocoa, 1 teaspoon cinnamon.*

Cream butter and sugar, add golden syrup dissolved in one tea cup of warm milk. Add sifted dry ingredients then soda dissolved in other tea cup of milk. Put into two greased sandwich tins (8 inch). Bake 30-40 minutes 375 deg. F. When cold, ice with chocolate icing and fill with mock cream.

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A novel and appetising dish made from a popular fish is sole a la melba.

Fish au Gratin

- 2 cups of flaked fish
- 1½ cups of parsley sauce
- 1½lb. of freshly cooked mashed potatoes
- 1½oz. of grated cheese
- 3 tablespoons of dried breadcrumbs
- Butter

Mix the fish and sauce, making sure the mixture is well seasoned. Make a border of mashed potato on a fireproof dish; pour the fish mixture into the centre and sprinkle the cheese and breadcrumbs over the top. Dot the top with butter and brown the fish in the oven.

Smoked Fish Custard

- 1 cup of cooked smoked fish
- 1 tablespoon of chopped parsley
- Salt
- 1 teaspoon of finely chopped onion
- Pepper
- 2 eggs
- 1 cup of milk

Flake the fish, remove the bones, and add the parsley, onion, and seasoning. Beat the eggs well, add the milk, and stir in the fish mixture. Pour the mixture into a greased casserole and bake it in a moderately slow oven (350 degrees F.) until it is set.

Salmon Loaf

- 1 cup of mashed salmon
- ½ cup of milk
- 1 cup of stale breadcrumbs
- 2 eggs
- 1 teaspoon of salt
- 1 teaspoon of lemon juice
- ¼ teaspoon of pepper

▼ Fish au gratin.

Salmon mould is a delicious summer dish.

Heat the milk and pour it on to the breadcrumbs. Let the milk soak in for a minute or two. Add the beaten eggs, fish, and seasonings. Pour the mixture into a well-greased loaf tin and bake it in a moderate oven until it has set. Turn it out and serve it with parsley sauce.

Fish Souffle

4oz. to 6oz. of finely flaked cooked fish
1 tablespoon of lemon juice
2 tablespoons of butter
3 tablespoons of flour
½ cup of milk
3 eggs
Salt
Pepper

Melt the butter, add the flour, and gradually add the milk, stirring the mixture all the time until it boils and thickens. Separate the egg yolks from the whites and add the beaten yolks to the sauce with salt and pepper to taste. Season the fish with salt, pepper, and lemon juice. Mix the sauce and the flaked fish. Fold in the stiffly beaten egg whites and pour the mixture into a greased dish. Bake it in a moderate oven until it is well risen and brown. The souffle should be soft inside and must be served at once in the dish or it will collapse. Serve it with parsley or anchovy sauce.

Salmon Mould

1lb. of salmon
2 cups of water
1 tablespoon of gelatine
1 teaspoon of finely chopped onion
1 tablespoon of vinegar or lemon juice
1 hard-boiled egg
½ teaspoon of salt
Pepper

Soak the gelatine in 2 tablespoons of cold water. Heat the rest of the water, bring it to the boil, and add the vinegar or lemon juice and the salt and pepper. Add boiling liquid to the gelatine, stirring the mixture until it is quite clear. Remove the skin and bone from the salmon and break up the salmon with a fork. Add the salmon to the gelatine mixture with the finely chopped onion. Wet a mould or basin and decorate it with slices of hard-boiled egg. Pour the fish mixture into the basin and when it has set turn out the mould.

Heading photograph by National Publicity Studios; other photographs by Sparrow.

☆

"Sugar and Spice and All Things Nice"

By DAPHNE EILERS,

formerly Field Officer in Rural Sociology, Department of Agriculture, Auckland

THERE are many spices from which the housewife may choose and many uses to which they may be put. Spices in foods, used sparingly, will stimulate the appetite as well as give a pleasant flavour to the food. It is important to note that they should never be boiled, as they develop a bitter flavour. They should be kept in air-tight containers and stored in a dark, cool cupboard.

LISTED below are some common spices and some suggestions for their use.

Cinnamon is the cured, dried bark of the cinnamon tree. It is sold in sticks and in ground form. It can be added to:—

1. The pastry covering of apple pie.
2. Sweet apple puree served with ice cream.
3. Hot milk drinks.
4. Whipped cream to serve with fruit.
5. Green beans just before serving.

Cloves are the dried flower buds of the clove tree. They can be purchased whole or ground. Most cooks add cloves to stewed apples and pears and to apple pie, but the flavour of peach pie is also enhanced by the addition of one or two cloves or a pinch of ground cloves. Pot roasts or corned meats are improved if cloves are put in with them.

Nutmeg is the kernel of a nut which grows on a tree native to the Molucca Islands. The interior covering of the nut is separated carefully and after drying is known as mace. The nutmeg kernel is smoked and dried. Its uses are usually confined to fruits and milk puddings, but a dusting of nutmeg on buttered asparagus, mushrooms, cauliflower, and spinach gives variation. Dumplings in stew are improved by a little nutmeg, as are chicken or pea soups.

Ginger is the dried rhizome (underground runner) of the ginger plant, which grows in most sub-tropical countries. It is perhaps the most widely used of the spices and is the flavouring of many cakes, puddings, and sweets. It imparts a fresh flavour when mixed with sugar or used alone on chilled melon for desserts, when added to apple puree in place of cloves, or when sprinkled on stewed fruit. Green ginger peeled and sliced thinly is used to a great extent in Chinese cookery and can be added with excellent results to stews, soups, and casseroles.

Allspice: As suggested by its name allspice has a flavour and an odour resembling a mixture of spices. It is the dried fruit of an evergreen tree. It is used in pickles and relishes and one or two whole allspice put into gravies and stews give a pleasing flavour.

Spiced nuts are a delicious sweetmeat for party fare and are very simple to make.

Spiced Nuts

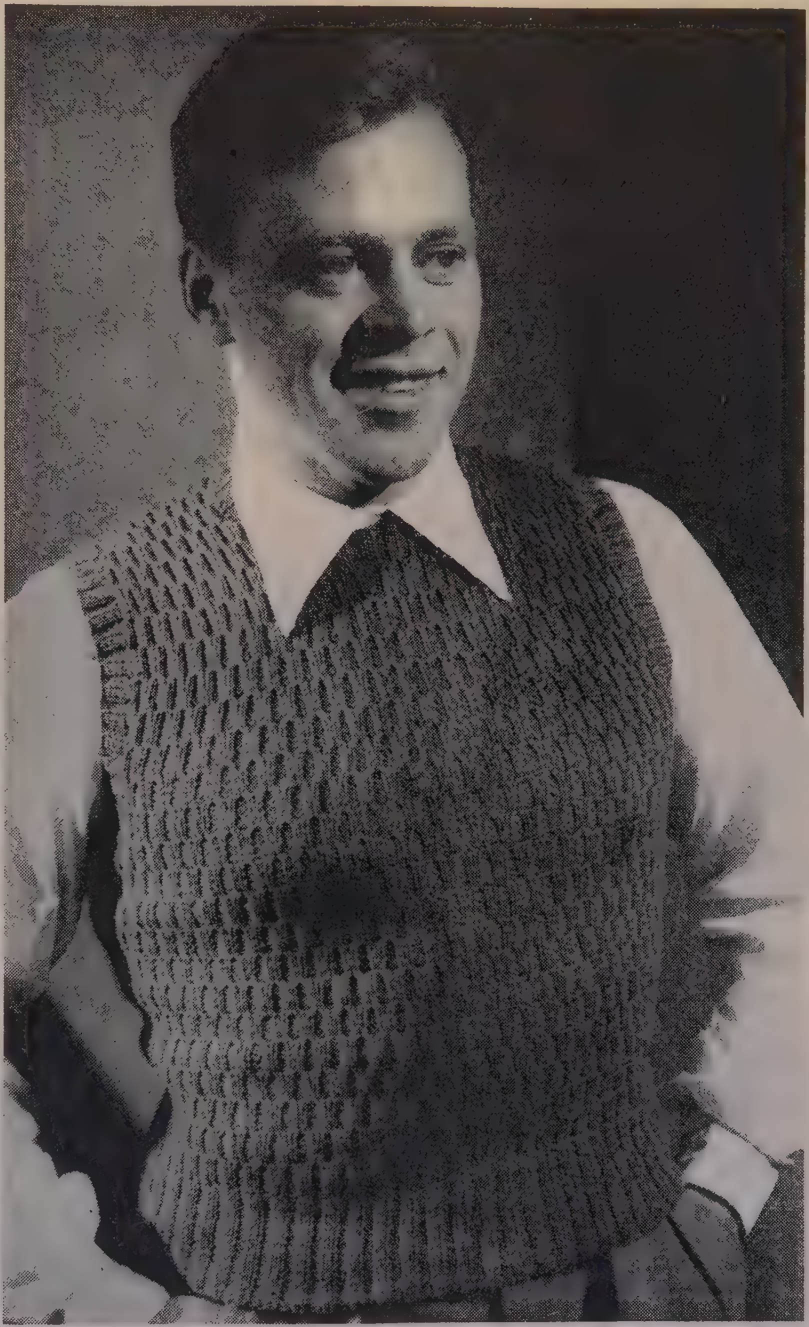
¼lb. of nuts
1 cup of sugar
1 teaspoon of salt
2 tablespoons of cinnamon
1 teaspoon of ground ginger
1 egg white
½ tablespoon of ground cloves
½ teaspoon of ground nutmeg
1 tablespoon of water

Blanch the nuts if necessary. Sift the sugar, salt, and spices together twice to ensure even mixing. Add the water to the egg white and beat the mixture slightly. Dip the nuts in the egg white and roll them in the sugar mixture. Place half the remaining sugar in a small baking pan, then put the nuts on top, making sure that they do not touch one another, and pour the rest of the sugar over them. Bake the nuts in a slow oven (250 degrees F.) for 2 hours. Remove and shake off the excess sugar.

◆

An Attractive Pullover in Broken Rib Stitch

THE man's pullover in broken rib stitch illustrated is an attractive garment for casual wear. Directions for knitting it are given below.



ABBREVIATIONS: St., stitch(es); p., purl; k., knit.

Measurements: Chest, 38in., 40in., or 42in.; length, 22in., 23in., or 24in.

Materials: 12oz., 13oz., or 14oz. of 4-ply wool; 1 pair of No. 10 and 1 pair of No. 8 knitting needles.

Tension: 7½ st. to 1in.

Pattern: Number of st. divisible by 4 st.

1st row: P. 1, k. 1, * k. the 2nd st. of next 2 st. before the 1st, then k. the 1st st. and allow both st. to slip from needle; now k. the 2nd st. of next 2 st. around back of 1st st., then k. the 1st st. and allow both st. to slip from needle. Repeat from *, ending with k. 1, p. 1.

2nd row: K. 1, * p. 2, k. 2. Repeat from *, ending with p. 2, k. 1.

3rd, 5th, and 7th rows: P. 1, * k. 2, p. 2. Repeat from * to last 3 st.; k. 2, p. 1.

4th, 6th, and 8th rows: As for 2nd row.

9th row: * K. the 2nd st. before the 1st st., then k. the 1st st. and slip both st. from needle, k. the 2nd st. of next 2 st. around back of 1st. st., then k. the 1st st. and slip both st. from needle. Repeat from *.

10th row: P. 1, * k. 2, p. 2. Repeat from *, ending with k. 2, p. 1.

11th, 13th, and 15th rows: K. 1, * p. 2, k. 2. Repeat from * to last 3 st. P. 2, k. 1.

12th, 14th, and 16th rows: As for 10th row.

Repeat from 1st row.

The Back

With No. 10 needles cast on 132 (140, 148) st. and work in rib of k. 2, p. 2 for 3in. Change to No. 8 needles and continue in pattern. Increase 1 st. at both ends of every 12th row, 6 times. When work measures 12½in. (13½in., 14in.) cast off for each armhole 8 (10, 12) st. at the beginning of the next 2 rows; cast off 3 st. at the beginning of the next 6 rows; cast of 2 st. at the beginning of the next 2 rows; cast off 1 st. at the beginning of the next row.

When work measures 23in. (24in., 25in.) slope shoulders by casting off 9 (10, 11) st. at the beginning of the next 2 rows, then cast off 6 st. at the beginning of the next 8 rows. Place remaining centre st. on a spare needle.

The Front

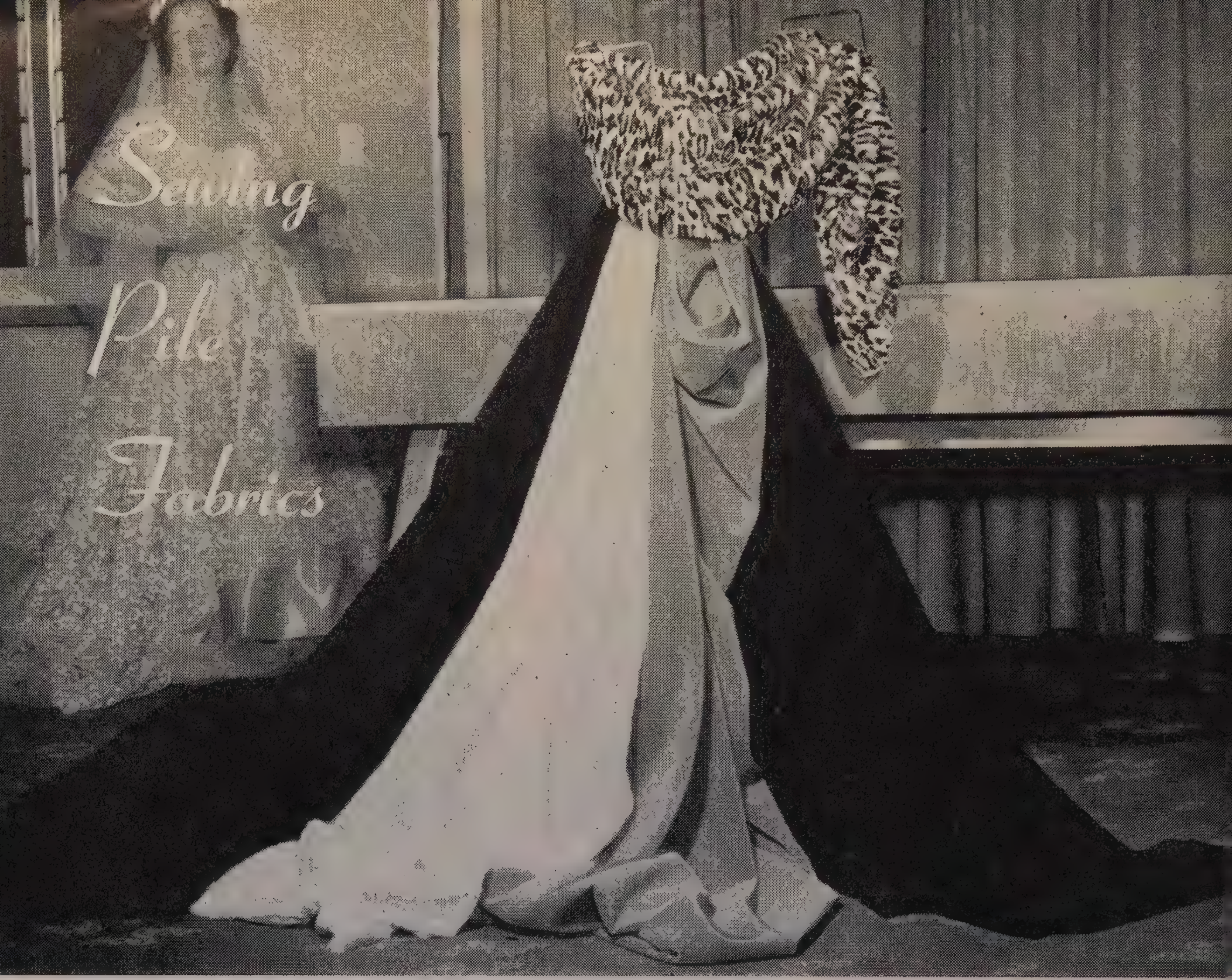
Work as for back until work measures 18½in. (19½in., 20½in.). Now place the 18 centre st. on a spare needle and decrease 1 st. at both sides of these 18 st. in every 2nd row until 33 (34, 35) st. remain for each shoulder. When front measures same length as back, cast off for shoulders as for back.

To Make up

Press both parts lightly on wrong side. Join right shoulder seam. With No. 10 needles pick up about 114 (118, 122) st. around neck opening and work in rib of k. 2, p. 2 for 1in. Cast off.

Pick up about 154 (158, 162) st. around each armhole and work in rib of k. 2, p. 2 for 1in. Cast off. Join side seams and sew slide fastener in left shoulder opening.

Sewing Pile Fabrics



▲ A collection of pile fabrics. Top—Ocelot coating (cotton backing; rayon, wool, and mohair pile). Outer left—Woollen mohair tweed coating. Inner left—Nylon fur fabric. Inner right—Rayon street velvet. Outer right—Rayon suede velvet.

By MAUD B. STRAIN,

Field Officer in Rural Sociology, Department of Agriculture, Dunedin

THE construction of pile fabrics develops a richness of colour tone that cannot be found in fabrics otherwise constructed. Velvet, for example, is a fabric dating back to early times and associated with luxury, pomp, and ceremony. It is a fabric of formality; rich and lustrous in itself, it needs no adornment and appears to best advantage in simple, uncluttered styles. The home sewer, mindful of the particular treatment required, will derive pleasure and satisfaction from working with this elegant fabric.

VELVET

VELVET has a characteristic soft, thick, short pile which creates an attractive effect of light and shade and which contributes largely to the luxuriance of the fabric. The pile is produced by weaving an additional warp (lengthwise) or filling (crosswise) yarn into the basic cloth structure of warp and weft (filling). The additional yarn is drawn away from the surface of the cloth by thick wires which form loops; the cutting or close shearing of these loops forms the pile.

Alternatively, pile fabrics are economically produced by constructing double cloth fabrics and then cutting the two apart. The cloths are woven in the loom at the same time, one on top of the other. Each cloth requires its separate set of warp and filling yarns. These cloths are combined by a complete fifth set of yarns interlacing between the two cloths. The two are cut apart while still on the loom by a small knife which moves back and forth like a shuttle.

The additional yarn may be a different fibre from the background cloth. In silk velvet, both pile and background will be silk. Nylon velvet is usually nylon throughout, but other velvets may have a silk or rayon pile on a cotton, rayon, or even wool background. Heavier furnishing or coating velvets may have a wool or mohair pile on a cotton, rayon, or wool background.

Velvets are given various finishes to produce different results as, for example, Panne velvet, which has a special lustre owing to the pile being pressed flat in one direction. Street velvet has been given a crease resistant finish which at the same time makes it spot resistant—a decided advantage over those not so treated, which water-spot readily. Lyons velvet is the name given to stiff velvets similar to those originally made in Lyons, France. Transparent velvet is a sheer fabric having a rayon pile and a rayon or silk back. Chiffon velvet is a light-weight velvet.

Velveteen is similar to velvet, except that, in weaving, the additional yarn is introduced in the weft and both pile and backing are cotton.

If the extra weft yarns are inserted in ribs instead of all over, corduroy is produced.

Pattern Selection

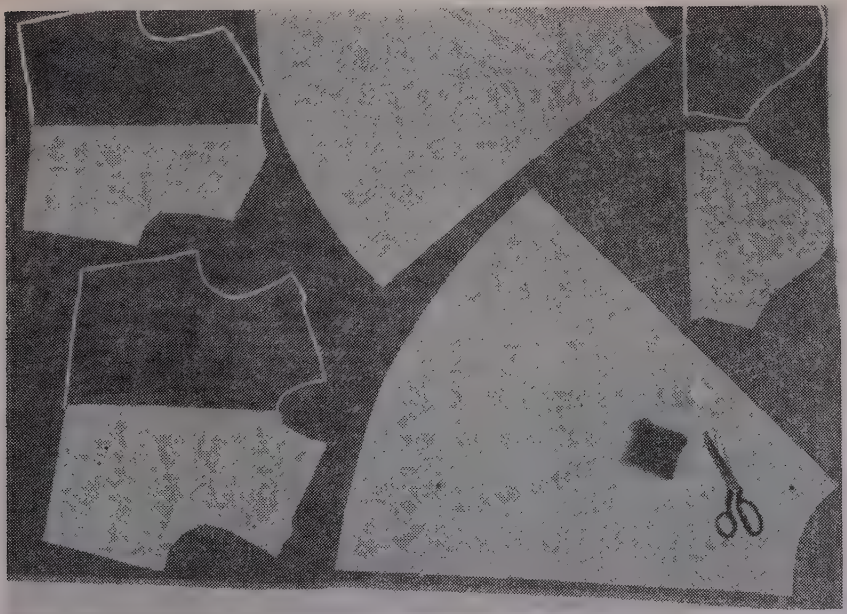
It is necessary to be familiar with the rather different treatment needed for pile fabrics before starting to cut out a frock in velvet, velveteen, or corduroy. These fabrics are beautiful and flattering when properly used, but the pattern must be selected with care and the material handled and sewn correctly to do justice to it. It is important when making up the garment to see that the pile lies all the one way so that it catches the light in the same direction.

Patterns should be as simple as possible, having only a few basic seams, and these should be hidden under folds or soft pleats wherever practicable.

Darts and tucks should be used sparingly and a centre front seam is best avoided. These fabrics are never top sewn; decorative stitching or seams finished on the outside should be avoided; the beauty of pile fabrics lies in their smooth, unmarred surfaces. Buttonholes are not advisable because they are difficult to make and bulky when made. Hooks and eyes or snap fasteners are better, or buttons with loops.

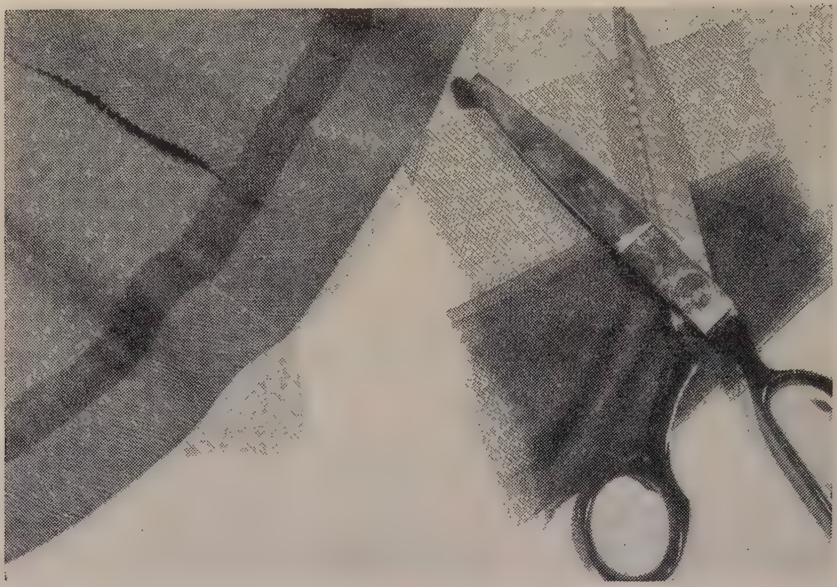
▲ Velvet is a luxurious fabric which is very suitable for draped effects. It requires no added trimmings, as the beauty of pile fabrics lies in their smooth, unmarred surfaces.

▼ All the pieces must lie the same way so that in the finished garment all the pile will run in the same direction. If this is not done, the varying light effects would make the garment unwearable.



Cutting out

Proper cutting is essential. All pattern pieces must be the same way and they must face. Pattern pieces can be cut double on a lengthwise fold. Whether the nap goes up or down is a question of personal taste; if the nap runs downward, the effect will be silvery and shimmering and the fabric will look lighter in colour. The most usual choice is for the nap to run upward, giving a rich, dark colour to the pile. Whichever direction of pile is chosen care must be taken that all pattern pieces run in the same direction. Material should be placed on the table wrong side



Finishing off the hem with net. Cut 2in.-wide strips of net, double them along their length, and sew them to the right side of the material, raw edges together. Turn the net upward over the raw edges and slip stitch along the folded edge to catch down the hem. Other seams may be finished with pinking, be machine sewn, or be bound with net.

down, pile side up, and the pattern pieces held in place with needles or thin steel pins (ordinary brass pins are thick and damage the velvet).

When cutting pieces separately and not on double material and if right and left sections are needed, turn over the pattern so that the two pieces face each other. It is most important for all pattern pieces to follow the true grain of the material. Cutting pieces double on a lengthwise fold automatically ensures that there will be a right and a left side, but pieces must never be fitted in top to bottom. The difference in the way the light strikes the nap is most noticeable and would spoil the appearance of the frock. All pattern markings should be chalked on the wrong side of the fabric.

Making up

All sections should be carefully basted (silk or polyester fibre thread is recommended; cotton may mar the nap) before being machined because pile fabrics have a tendency to creep away from the presser foot and so make puckered seams. The machine should have a fine needle, the stitch should be longer and the tension looser than usual, and the material should be fed gently to the presser foot. Velveteen and corduroy are usually sewn with mercerised thread and velvet with silk thread.

Sew seams in the direction of the pile, that is, from the bottom upward; plain seams are most suitable.

Velvets tend to fray, so some finishing off is necessary; pinking is satisfactory, or oversewing the raw edges, or binding the raw edges with net. This last method is more trouble, but makes a firm, neat finish. The hem should be bound with seam binding or net. Net should be in a matching colour and cut in 2in.-wide strips. These strips are doubled and sewn to the right side of the material, rough edges together; then the net is folded back over the raw edges and slip-stitched along the fold to catch down the hem.

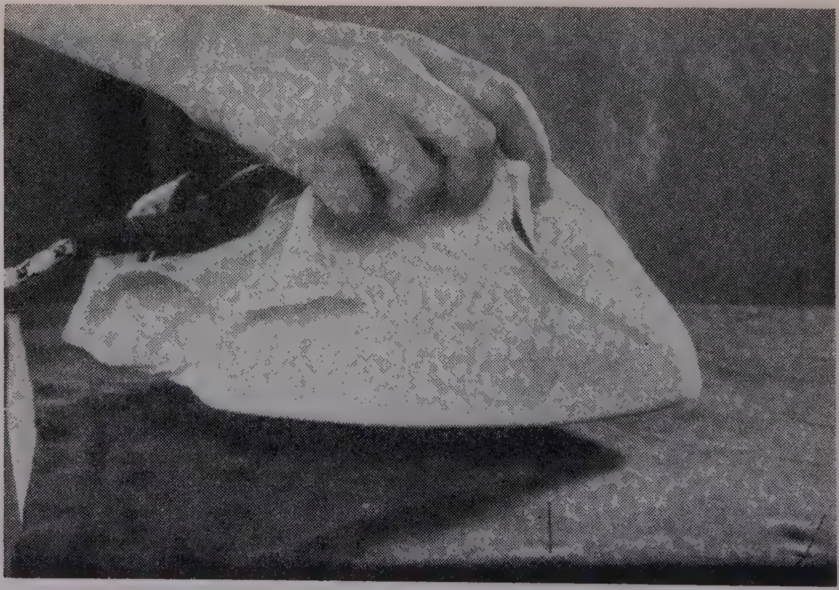
Inner facings of sateen or silk to reduce bulk are permissible provided they do not show from the outside. Sometimes with delicate chiffon velvets a little strengthening with net is advisable.

To stitch two bias seams together place paper under the seam to prevent sliding. Stitch and tear the paper away.

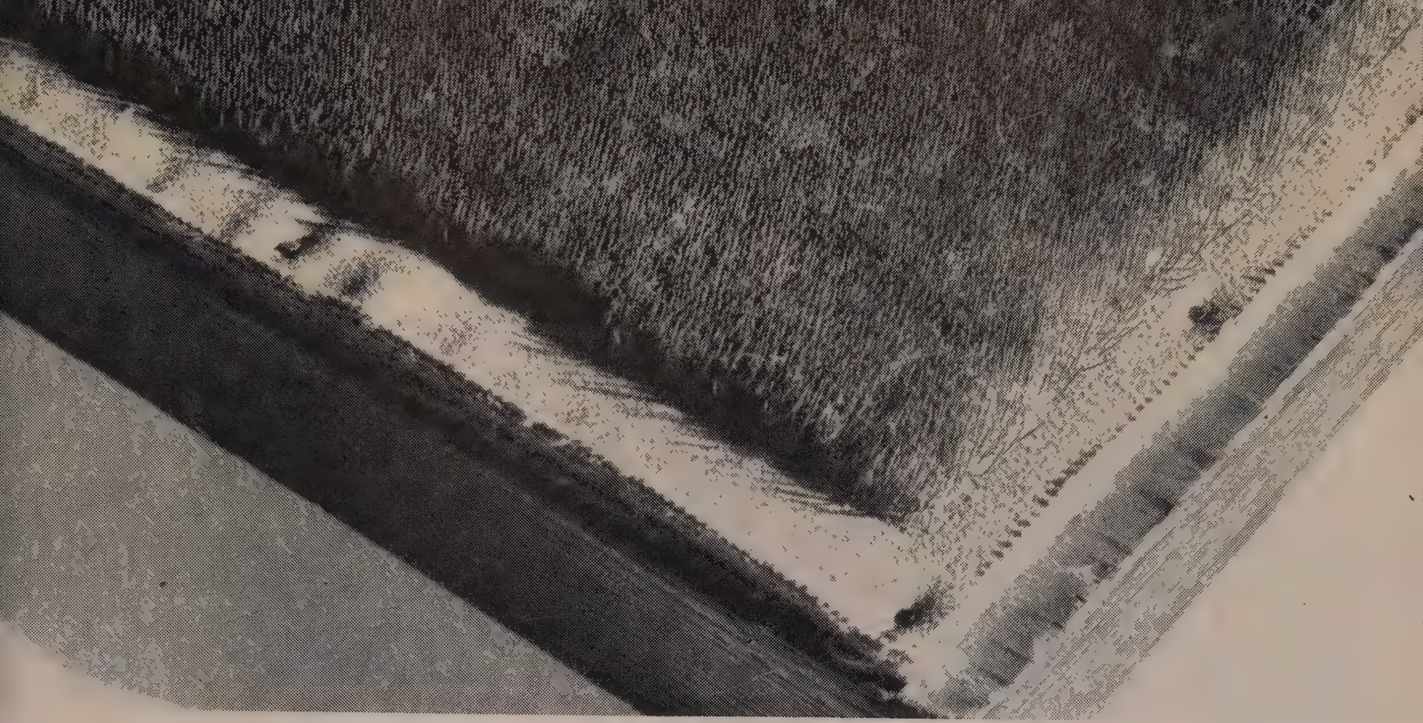
Pressing

Care must be taken in pressing velvet and pile fabrics generally, if the natural lustre and pile are to be preserved. A velvet board is most satisfactory; it has small, fine needles projecting upward from a canvas-covered surface. The velvet is placed pile downward on the needles and is pressed with a warm iron over a light pressing cloth. The iron must not be pushed along—just lifted and pressed, lifted and pressed. If a double pile surface such as a collar or coat front is to be pressed, turn the end of the velvet board, which is flexible, over the fabric and steam through both layers.

If a steam iron is available, the method is rather different. The garment is placed right side up on an ordinary pressing board and a steaming steam iron is held just above, but not touching, the pile and is moved slowly over wherever the pile needs lifting. If heavy creases are to be



Steaming velvet with an iron round which a damp cloth has been placed. The iron is held $\frac{1}{2}$in. above the right side of the velvet and moved backward and forward over the places where the pile needs raising.



[*Campbell*

A corner of a velvet board. When a velvet board is being used the material is placed pile downward on the needles and the wrong side is pressed with a warm iron over a light pressing cloth. The iron must not slide over the fabric, but must be just pressed and lifted, pressed and lifted.

removed, a steam iron is most satisfactory; if a steam iron is not available, steam from the spout of a kettle can be used. Hold the fabric close to the steam outlet long enough to raise the pile but not long enough for the fabric to become wet, being careful not to touch the steamed parts while they are damp, as finger marks will show. After the garment has dried it should be brushed lightly with a bristle brush.

If there is no needle board or steam iron, a commonly used method is to stand an iron on its end in the resting position and place over it a damp press cloth. Steam will result and with the velvet held loosely pass it swiftly over the damp cloth and raise the pile by gently stroking it with a soft brush. The pressing cloth must be kept well moistened throughout the process.

To press open the flat seams used when joining pieces of velvet, place the seam pile surface downward on a needle board and run the tip of the iron lightly along the seam. If there is no needle board, pin one end of the seam to the end of the ironing board or to one edge of it, hold the seam taut, and steam it with a damp cloth held round the iron, or pin the cloth to the board and hold it in the same position as the garment.

Care in Wear

Velvets are inclined to bruise easily and lose their attractive appearance if precautions are not taken to guard against this. In transit from manufacturer to consumer velvets are not folded or rolled as are other fabrics but are wound on a frame which spaces the layers of fabric so that two surfaces are not rubbing together.

Care in wear will prolong the useful life of all pile fabrics. Velvet tends to collect dust and fluff and requires frequent attention. Brushing lightly with a soft brush or velvet pad is helpful, but too frequent brushing may damage the pile. Another suggested method is to wrap transparent tape, sticky side out, round the hand and draw this lightly across the surface of the velvet; loose lint will adhere to the tape.

Velvet garments should be hung loosely in a wardrobe, not squeezed in between other clothes which would crush the pile. Water spots can sometimes be rubbed away with a small piece of matching dampened fabric. Matting of the pile is removed by frequent steaming. A velvet frock can be freshened in appearance by hanging it in a steamy atmosphere. Lightly soiled velvet may be improved by rubbing it with a cloth dipped in carbon tetrachloride. More heavily soiled velvet is best dry cleaned.

VELVETEEN AND CORDUROY

All the foregoing suggestions apply equally to velveteen and corduroy, but these two, being all cotton, or rayon pile with a cotton backing, have the advantage of being washable (depending of course on the construction of the garment and the materials used for trimming, if any).

First wash the garment in mild soap and warm water. Squeeze the suds through the fabric and rinse the garment in several changes of fresh warm water.

Never twist the garment or use the wringer to press out water. Allow it to drip dry, shaking it occasionally to bring up the pile. Straighten it to its original shape. Hang dresses, shirts, and jackets on hangers, skirts across the waistband, and overalls, slacks, and shorts at the bottoms of the legs.

When the fabric is almost dry iron it very lightly on the wrong side. With the longer-pile types simply run the fabric backward and forward over an upturned iron, or press it with a steam iron. Hold the iron slightly above the fabric on the wrong side. Go slowly with the ribs so that steam penetrates to the right side. Raise the pile by brushing the fabric on the right side.

Making a garment from these fabrics is not difficult if one bears in mind the salient point in dealing with pile and nap fabrics. The pile or nap must run the same way in each piece of the garment and, as with all materials, the pattern must follow the true grain of the material. Styles should always be simple, relying for their effect on the inherent beauty of the material rather than on elaborate design.

The home dressmaker using velvet for the first time with some misgivings but observing carefully these few simple precautions will, in the satisfaction derived from seeing the attractiveness of the finished article, admit that the difficulties were largely imaginary.

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